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Contents for August-September, 1952

Air Service for Farmers	Pennsylvania Farmer	1
I Caused an Accident	Ohio Farm Boy	6
Farm Fire First-Aid	Iowa Farm Science	7
Spotlighting an Old Trouble	New England Homestead	13
Knowhow Raises Quality Beef	Colorado A & M News	15
Why I Believe in Soil Conservation	Soil Conservation	17
Farmers Report on Hay Crushers	Successful Farming	20
Farm Assembly Line	Turkey World	25
Prospects Better for Hogs		28
Science Looks at the Cow	Better Crops With Plant Food	29
Cornstalks Decrease Yields	Ohio Farm and Home Research	33
Barnyard Listening Post	Electricity on the Farm	37
Spraying Apples for Less Money	American Agriculturist	41
He Built $600 Into 2,000 Acres	The Western Farm Life	45
Beef Cow Herds Can Be Profitable		47
Our Sacred Cows	Hoard's Dairyman	48
What Sacred Cows?	Hoard's Dairyman	49
Topdressing Meadows and Pastures	Ohio Farm and Home Research	59
Ladino Can Take It	The Michigan Farmer	63
Farm Leases Should Cover New Costs		64
Ham Sandwich and the Common Cold	The Nation's Business	65
Get Two Lamb Crops a Year	The Southern Planter	73
Stop Wet Litter	Everybody's Poultry Magazine	75
Worth $100 an Acre for Grazing	Capper's Farmer	77
Top-of-Ground Silos	Farm Journal	81
Soil Test Living Crops		83
Do You Know?		84
Road to Efficient Farm Production	Ohio Farmer	85
New Sanitizer for Milking Machines	Rural New Yorker	90
The Widow's Way, A Farm Story	Henry Exall	93

The Farmer's Digest

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The Farmers Digest

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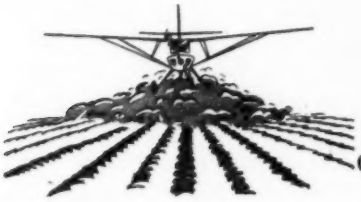

Air Service for Farmers

Norman F. Reber

Condensed From Pennsylvania Farmer

EACH YEAR a growing segment of agriculture takes to the air. Custom air service for farmers is proving itself in the hard give-and-take of competition for patronage. Operators are carving a niche for themselves in the farmer's favor. Their costs are in line with the price tag on ground applications. They save labor at critical times. When ground applications are impossible, they stand ready to give a service that money cannot buy anywhere else.

Eastern Air Activities of Pennsylvania is a good example of a growing concern in this new business. The firm has seven Stearmans — four dusters and three sprayers — in operation and in 1951 "serviced" 25,000 acres. This compares with only 4,000 acres back in 1948. If things go as expected, the acreage figure may go up to 30,000 by the end of 1952.

Men like the young "president-mechanic" of Eastern are playing a stellar role in the steady increase of custom air service in the state. His name is R. L. Sealover, and he practically lives in coveralls at the Thomasville airport. He helps to repair planes and directs his pilots' work from a little office just off the hangar garage. During his spare time he's out on the road making the contacts that bring the orders that keep his company in the black.

It's obvious, too, that he's well informed on sprays and dusts and top-dressings. He has to be—to hold the farmers' confidence. During the off season, he's out attending meetings in other states —getting up-to-the-minute infor-

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mation. When farmers call for service, he's in a position to make recommendations.

Bob was a mechanic in the air force during the war. After he got out of the service he got the notion he'd try this business of custom air service for farmers and get rich quick. The riches haven't materialized, but he's making a "go" of it.

Operations of Eastern Air range from March to November —from the sunny cotton fields of the south to the orchards of Vermont. In March there is a nice demand for top-dressing of pastures and small grains. Ammonium nitrate has been the most popular — something like 20 pounds to the acre of actual nitrogen.

A running summary of Eastern's calendar might run something like this: Top-dressing pastures and small grains, late winter and early spring; application of benzene hexachloride and toxaphene for spittle bugs; sulphur and phygon—also fermate —for apple scab; parathion dusting for aphids in peas until June. Parathion for the beetle in beans; copper, Dithane, Parzate and Zerlate for blight in potatoes; 2-4-D, amine form, for weeds in corn; DDT and parathion or DDT and TEPP on corn ear worm; DDT and aldrin for mosquitoes over towns; DDT for the corn borer (until early August); rotenone for the asparagus beetle during cutting period and DDT is used following the cutting period; sulphur dust for brown rot in peaches until middle of September; from September to last of October, they are busy in the orchards putting on the stop-drop hormone — naphthalene acetic acid.

Farmers don't just hire Sealover for the fun of having his planes "buzz" their fields and pastures. Many do not have the labor and equipment to do the job. Others may have both, but might consider other farm operations more important. Then Old Man Weather gets into the act so many times. A plane will put on the poison when ground machines would bog down. Sealover's charges are pretty much in line, if not lower, than the costs of ground applications.

Costs of Top-dressing

Let's look at the costs of putting ammonium nitrate on small grains in the spring: The charge has been $4.50 an acre for application and material. This is for 20 pounds of actual nitrogen per acre. Most farmers get their money back on this deal. Nu-Green has cost slightly more at $5 an acre. In the case of wheat, for example, an average of seven more bushels to the acre is realized by farmers in Bob's territory. Figuring wheat at $2 a bushel, this comes to $14 an acre return

for each $4.50 spent. This is a pretty tempting proposition to the fellow who is all tied up with early spring work and can't see getting into "mushy" fields with tractor and drill.

The day I drove over to see Sealover, pilot Roy McConnell had made an early morning trip to the Manheim area, northern Lancaster county. By 10 o'clock he was back already. He had dusted 106 acres of grass field for the spittle bug. Charge for this work, including the material, 26 pounds of one and a half per cent hexachloride, came to $3.85 an acre. This stuff is all right except where root crops are to be planted within two or three years, as it leaves a residue in the soil. Toxaphene is being used where residues are undesirable.

One York county farmer told me that he was getting effective control of spittle bug with air dusting of toxaphene in his wheat and strawberries.

The best way to get low costs is to enter a seasonal contract to have all the work done during the season. Much of the orchard work, both in Adams county and in Vermont, is done on this basis and has been averaging five cents a pound. This is cost of application and does not include cost of material.

For borer control in corn with DDT the charge is $3.50 to $4.25 an acre, depending on the material.

Does It Pay?

Blight control of tomatoes has been a successful stunt for Eastern. They sprayed the grower fields for a large canning company last summer and these are the cost figures Sealover claims he got from the company: A saving of 75 cents per acre per application over ground spraying contracted for by the company.

The above figures give some idea of the costs, but each farmer must determine for himself whether he should use the service. He needs first to have his local service give him the price on a specific spray he wants put on. Then he can compare the figures with the charges for custom ground spraying service. If he has his own equipment and labor available and is not crowded with too much other work, he can do the work himself. But, even so, custom air service is a mighty handy thing to have around in case fields are too wet for ground equipment. Or in case of an emergency when pests get the upper hand and something has to be done fast.

Of course, this business of bad weather can work in reverse, too. Planes can be grounded for days at a time due to low ceiling. This when it might be possible for ground equipment to go ahead with the job.

Custom air service for farmers

has proved itself to this extent. It has made a pretty solid niche for itself in offering the farmer a service that cannot be duplicated by any other group. The fact that treated acreage is on the upgrade and the number of farmers who rely on it are on the increase is pretty good evidence.

Sealover sees a very good future for air application of liquid nitrogen, which has been in the news recently. The big advantage, he says, is it gets away from bags. The nitrogen would be moved in by railroad tank cars and transferred to tank truck and hauled to the airport. There it would go right into the airplane spray tanks for quick delivery to the farm. This might work out all right for supplementary surface applications such as small grains in the spring. Or instead of a side-dressing nitrogen application on corn at time of last cultivation.

Frank A. Gibson, Gibson's School of Flying, says his outfit charges $2 an acre plus material for spraying. Sprays include toxaphene on legumes for spittle bug and horn worm on tobacco; DDT for corn borer, ear worm and Japanese beetle; chlordane for army worm. Other items include mosquito and fly control work around farm buildings, outdoor theaters and over cities and towns; dissipation of frost on late vegetables; defoliage, the killing of weeds in soybeans for easier combining.

Unlike some other occupations, the airplane spraying business is definitely for young men. For example, I didn't see any one over 30 at the Eastern hangars. Sealover hasn't hit his thirties yet, nor has pilot Stoughton. And pilot Roy McConnell was celebrating his 29th birthday the day of our visit.

I delved a little into Roy's background. He is a native of Tennessee and he flew Wildcats and Avengers for the navy during the war. Then came a year as flight instructor.

"How did you get into this business?" I asked him.

"I got hungry," he said simply. Incidentally, we might add, he gets paid on a commission basis for his work.

Flying Hazards

"Trees don't give us much trouble," said Roy, "unless you hit 'em too low. But wires are our main hazard. They'll wind around the landing gear and drag you down."

But I gathered he wouldn't turn down a job on account of wire. He told of a job where he flew over two wires at the ends of the field and under one in the middle. Nothing like wires to make life interesting and hazardous for the spray pilot.

Farmers might have the notion that some of their fields are too inaccessible for air applications.

For them we have this quote from Roy, "We haven't turned anything down yet."

Wind speeds are the bane of a pilot's life. They determine whether he can go out on the job or sit around at the hangar, just itching to go. Dusting is out in wind speeds of over five miles an hour. This is usually done on the dew of early morning or before dusk. Spraying can be done throughout the day, if wind speeds are not more than 10 or 12 miles per hour. In an emergency, pilots will even spray in 30 mile an hour winds. Roy recalled that he did this on a rush army worm job in Missouri back in 1950. That was a dawn to dusk job for a whole week.

Close to 50 per cent of Eastern's work is in Vermont and Pennslyvania, (Adams county) orchards. This includes apple scab and stop-drop hormone control. For the latter work, smoking is a common method. For this, oil is injected into the exhaust and the hormone chemical into the smoke-carrying exhaust pipe. The smoke acts as a carrier of the hormone.

Last season Eastern's pilots helped Trexler Orchards in Lehigh county to hold over their apples about four weeks. This not only stretched out the picking season, but provided a service at a time when available labor was busy with harvesting.

The following figures will give some idea of the great speed with which acreage can be covered. This is important, especially in an emergency, such as Pennsylvania farmers experienced with army worm in 1950. Dusting a swath 45 feet wide, the pilot needs to travel only a little more than 1,000 feet and he has covered an acre. This he does in no more than nine seconds. On a spray job taking in a swath of 60 feet in width, he only needs to travel 800 feet to cover an acre. This can be done in seven seconds. Many fields in Pennslyvania are short and irregular in shape, so this cramps a pilot's style somewhat. It isn't like the ideal conditions in states of the southwest like Texas, where tremendous coverages can be made in an incredibly short time.

Roy McConnel gave an example. He dusted a field of cotton and on one trip across the field covered 20 acres.

A Welsh farmer, fined for the sale of adulterated milk, explained, "The weather was so bad, the water must have soaked through the skin of my cows."

I Caused an Accident

The accident I caused could have been caused by any farm boy. I knew all there was to know about farm safety.

A neighbor, Bill Thomas, came over and started to harvest our wheat. He had combined one good day and got a start on the second when the accident occured.

Around noon I drove into the field after unloading the third load. I got out of the truck just as Bill came around the corner of the field. I knew it would be awhile until he would be ready to unload, so I thought I would get on the tractor and ride around.

Here is where my indifferent attitude enters into the picture. My father had told my brother and me, time after time, "Never get on an implement while it is moving."

Regardless of these instructions, ignoring them all, I leaped forward aiming for the drawbar. My one foot landed on the drawbar but I had lost my balance. I tried again but it was in vain. I fell forward over the driveshaft to the ground into the path of the oncoming blade. I rolled to my knees to get up but at that instant I felt a sharp pain in my right arm. Bill finally got the combine stopped, and as I looked at my arm I saw blood gush from the raw flesh. Then everything turned black and I went limp.

I don't remember what happened from then until I opened my eyes on a hospital bed. The doctors told me my right arm had been broken and the main nerve in that arm had been severed.

Unless you have been closely associated with an accident, you probably have to think hard to remember any such instance. The reason for this is that farm accidents are publicized so very little. News of accidents fill the bottom corners on back pages of newspapers and are never even mentioned over the radio. At the same time, other items are publicized by pictures, headlines, and are broadcast constantly over the radio. An example of this practice is the Korean war. In the first six months of the Korean war, about 6,000 United Nation troops lost their lives. During the same period in the United States, accidents killed 8,750 American farm people.

The figures are gruesome. You might ask "What can I do to help prevent accidents?"

Probably the biggest thing you can do, though the hardest, is take time to do the job. *Put carelessness aside* and *let safety be first.* It may save you from pain, sorrow, hospital and doctor bills. Don't you be caught saying, "I caused an accident."

—JON GREENEISEN, Ohio FFA Member

FIRE First Aid For Your Farm

Norval J. Wardle and Mark H. Brosier

Condensed From Iowa Farm Science

For your protection, the authors suggest that you have a fire extinguisher on your electrical distribution pole, in your farm shop, on your tractor, in your car, and in your kitchen.

FARM FIRES have often been accepted as unfortunate occurrences which couldn't be helped. Rural areas were the last field which organized fire protection entered. Many rural fire departments are now organized. In some states, practically every farm is included in the area of a rural fire department.

But to make fire protection effective, you should know what to do yourself in case of fire on your farm. You can make your farm more fire-safe by having fire "first aid" equipment.

You should know how and where to report a fire quickly. Have a card with instructions for reporting a fire on your wall by the telephone or on the inside cover of your telephone book. Check with the fire department serving your area on how to report fires to them.

Fire Extinguishers

Fire extinguishers are absolutely necessary for fire safety. There are many kinds of fire extinguishers. Unfortunately, no one kind will control *all* types of fires effectively. But here are some general rules which apply to all fire extinguishers:

1. You and members of your family should learn how to use extinguishers effectively.

2. Follow the directions of the manufacturer for refilling or charging, maintenance and operation.

3. Check your extinguishers every six months to see that they're in good working order.

4. Keep extinguishers in regular and definite places so you'll

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NORVAL J. WARDLE is assistant professor of agricultural engineering and farm safety specialist for the Agricultural Extension Service. MARK H. BROSIER is acting supervisor of firemanship training for the Engineering Extension Service.

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know where they are when needed.

5. Clearly mark the place for keeping a fire extinguisher. (For example, have a red background for the extinguisher with a red bar below at the floor level or on the floor and one above.)

Types of Fires

Since there are different kinds of extinguishers for various types of fires, it's a good idea to know about these types of fires—and which extinguisher is best to control each type. There are three main types of fires:

Class A — Wood, trash, paper and similar combustible materials. These fires are best controlled by quickly quenching or cooling with water or with extinguishers using large percentages of water.

Class B — Grease, oil, gasoline and other flammable liquids. These fires are best controlled by smothering or blanketing to cut off the oxygen supply.

Class C—Electrical equipment, motors and generators. Here it's important to use an extinguishing agent which doesn't conduct electricity nor injure the equipment.

Try to remember this "ABC" classification. It will help you select the right extinguisher. Extinguishers carrying the label of the Underwriters' Laboratories (UL) or the Factory Mutual Laboratories (FM) have been tested and have met exacting requirements of safe construction and performance.

In the case of the UL label, extinguishers are classified according to the class of fire with which the extinguisher is effective. An extinguisher rated "A-1" will extinguish a deeply charred fire in a standard 10 by 10-foot latticed wood panel. It takes two extinguishers rated as "A-2" to put out the standard 10 by 10 panel. To rate "B-1," an extinglisher must be able to put out (1) a fire of two gallons of gasoline in a round tank four feet in diameter, 23 inches deep with 10½ inches freeboard to water under the gasoline, and having 20 seconds to preburn, or (2) a fire of one gallon of gasoline on an eight by four foot area on concrete with no preburn.

To be suitable for class C fires, the extinguishing agent must be a nonconductor of electricity. And it must have a small amount of extinguishing value on class A materials. Often extinguishers are rated as effective with two different classes of fire such as "A-1—B-1" or "B-2—C-2."

There are three general types of fire extinguishers: (1) plain water, (2) water and chemical, and (3) chemical. There are several kinds of each type. The more common extinguishers with general information about them are shown in the table.

Controlling "A" Fires

More than 90 per cent of farm

fires are class A fires, often resulting in large financial losses. It's the one type of fire you should be most prepared for, although there are increasing numbers of class B (flammable liquids), and class C (electrical) fires. Most farms have no extinguishers. And many of those which do, often have expensive extinguishers which aren't effective with the major fire problem.

Water Pump Tank Extinguisher: The number one extinguisher for the farm is the water pump tank. This extinguisher not only is effective with the most common type of fire, class A, but it's also economical to purchase and refill.

This extinguisher should be protected from freezing. One antifreeze is calcium chloride (granulated, 75 per cent) at 3½ pounds to a gallon of water. You can buy calcium chloride charges which include rust inhibitors. After use, the extinguisher should be well washed out with clean water. Pump and hose should be empty before refilling.

Pump tanks usually are equipped with a hose two to four feet long. But you can increase their effectiveness by replacing with a 20 to 25-foot hose.

Locate the water pump tank at some central place in your farmyard. You might place it in a special box on the electric wiring distribution pole. Then when you need the extinguisher, you can pull the main electric switch so there'll be no electrical fires to contend with.

"B" and "C" Fires

Class B and C fires are increasing on farms. Water pump tank extinguishers aren't effective with these fires. However, notice in the table that one group of extinguishers, chemical is effective with both B and C fires. You might have one of these on your tractor, one in the shop by the entrance door, one in your car and one in the kitchen near the range.

Vaporizing Liquid Extinguishers: This is the most common of the chemical extinguishers. It's approved for both B and C fires. Basic material in these extinguishers is carbon tetrachloride in liquid form. For use follow instructions on the name plate. Carbon "tet" extinguishers should not be expected to control class A fires other than very small ones.

To refill use *only* carbon tetrachloride which has been prepared for fire extinguishers. Commercial carbon tetrachloride contains traces of water which may react to form acids that will corrode extinguisher parts and conduct electricity.

When you play carbon tetrachloride upon a fire, the liquid immediately evaporates and forms a smothering blanket of vapor which is heavier than air and smothers the fire. When used on

Facts About Fire Extinguishers

Type of extinguisher	Extinguisher effect	Effective with fires of Class A	B	C	How to operate	Length of discharge	Recharge	Protection from freezing
PLAIN WATER								
tank Pump	cooling	yes	no	no	pump by hand	30 to 40 feet	after use	approved antifreeze chemicals may be added to water
Gas Cartridge	cooling	yes	no	no	turn over, bump on ground	30 to 40 feet	after use	
WATER AND CHEMICALS								
Soda-acid	cooling	yes	no	no	turn over	30 to 40 feet	annually	keep in heated cabinet if building is unheated—never add antifreeze
Foam	cooling smothering	yes	yes	no	turn over	30 to 40 feet	annually	
Loaded stream	cooling oxidation inhibiting	yes	yes	no	turn over, bump on ground	30 to 40 feet	after use	none needed
CHEMICAL								
Vaporizing liquid	smothering	*	yes	yes	pump by hand	20 to 30 feet	after use	none needed
Carbon dioxide	smothering	*	yes	yes	open valve at top	3 to 6 feet	after use	none needed
Dry compound	smothering	*	yes	yes	open valve at top	8 to 12 feet	after use	none needed

* Effective only on small surface fires.

flammable liquids in tanks or other containers, direct the stream to hit the opposite side of the container — not directly into the liquid. On other fires, direct the stream at the base of the fire and sweep it with recurrent movements and spurts. Keep a supply of carbon tetrachloride on hand so you can refill the extinguisher immediately after use.

Carbon Dioxide Extinguishers:

These extinguishers have become very popular in the last few years. They're easy to handle and quite effective in controlling gasoline and electrical fires. And they're of some value on small class A fires.

Carbon dioxide extinguishers need special refilling equipment. Some of them must be sent back to the manufacturer for refilling. Find where you can get the extinguisher refilled at the time you purchase it. Some fire departments have facilities for refilling this type of extinguisher. It's well to have an extra carbon-dioxide extinguisher for protection while the used one is being recharged —especially if it must be sent some distance.

Carbon dioxide is an inert gas, heavier than air. Released around a burning object, it replaces or dilutes oxygen until it won't support combustion. As carbon dioxide is expelled from the extinguisher, it cools, and about 30 per cent forms into carbon dioxide "snow" or "dry ice." This snow has some cooling effect and may aid in preventing flashback when the fire is small. But this cooling effect is negligible as compared to that of water. Carbon dioxide's principal extinguishing effect is that of smothering.

Discharge the carbon dioxide as near the fire as possible. Apply first at the near edge of the fire and sweep the fire in short, recurrent discharges of the carbon dioxide until the fire is out.

Weigh a carbon dioxide extinguisher at least every six months. If the weight loss is more than 10 per cent of the rated capacity, the extinguisher should be recharged.

Dry Chemical Extinguishers: This is the most recently developed type, and there's quite a bit of variation within this type. Nozzles are different. Some disperse a broad, fan shaped stream for greatest coverage at close range. Others disperse a narrow, fan shaped stream to attack fires from a distance.

The extinguishing agent basically is sodium bicarbonate with added components to produce a water repellent and free flowing powder. Powder is expelled by pressure from a carbon dioxide cartridge which must be replaced each time the extinguisher is used.

Weigh the cartridge at least once a year. If the loss in weight is more than that stated on the name plate, replace it. Use only chemicals and cartridges recommended by the manufacturer. (One extinguisher uses air pressure to discharge the powder. It has a pressure gauge, and the pressure may be renewed as needed at any service station.)

Dry chemical extinguishers are effective against both class B and C fires. The powder has about the same electrical conductivity as

air. Direct the stream at the fire so as to blanket it.

Other Extinguishers: Many other kinds of extinguishers are manufactured and available on the market. But many of these are for special situations. The four which we've described are best adapted for fire first aid on the farm.

In selecting a fire extinguisher for your farm, it never pays to take a chance. It's best to buy only extinguishers which have been approved by the Underwriters' Laboratories or Factory Mutual Laboratories for the specific type of fire for which control is planned.

Water Supply

One of the main difficulties of controlling farm fires is water supply. A good water supply on the farm has helped save many buildings, their contents, livestock, and in some cases, lives of people. There are three common ways to supply water for fire control: (1) pressure water system, (2) ponds, and (3) fire cistern.

For a pressure water system to be effective, the source must be continuing even when a number of the buildings on the farm are on fire. Usual source on farms is a pump run by an electric motor. To assure the water supply during a fire, the pump motor should be wired separately—pump motor wire should come off the main line between the meter and the main switch, and the wire should be underground. In this way electricity to all buildings may be cut off, but you still can have an operating water supply.

For ponds to be effective in fire control, they should be within 1,000 feet of the farmstead. If your pond is further away, have tanks available to haul water to the fire.

Fire cisterns should be kept filled and reserved for fire control. Such cisterns should hold 2,000 to 3,000 gallons and should be located within 700 feet of the buildings but not closer than 50 feet. You can get plans for fire cisterns from your county extension director.

Your farm should have one good ladder reserved for fire control. Don't paint the ladder, shellac or varnish it. Paint a sign on the ladder — "Fire Use Only." Hang it on the outside wall of a centrally located building. Put another sign there — "Keep Fire Ladder Here."

If you have no other water supply available, keep two or three barrels full of water. Keep antifreeze in the barrels — two pounds of calcium chloride per gallon is satisfactory. Also keep three or four buckets in each barrel. Paint the buckets and barrels red or paint "Fire" on in large red letters.

Spotlighting an Old Trouble

Tickling Bossy's Tummy Helps Control Bloat

Charles H. Burch

Condensed From New England Homestead

THE EXACT causes of bloat are unknown. And that makes the cures difficult.

About one out of every 10 animals with acute bloat dies. Milk production drops off for several days when bloat strikes the dairy herd. Dairymen often fail to use their pastures fully after once experiencing bloat trouble.

Most of the bloat problems can be solved if we prevent cows with big appetites from wading into a new pasture, points out Dr. W. D. Bolton, extension animal pathologist for the Vermont Agricultural College.

Dr. Bolton explains that bloat results from rapid gas formation in the cow's rumen—or first stomach. In most cases, it's due to fast eating of fresh, green legumes. The problem then boils down to conditioning the cows gradually to green pastures in the spring.

Many dairymen find they have less trouble when they feed their cows grain and hay before turning them out to pasture. Green, leafy hay will prevent them from "making hogs of themselves" when they reach a new pasture.

Others use a self-feeder to encourage their cows to eat dry hay while they're on pasture. The self-feeder, loaded with hay, is pulled right onto the pasture. Strangely enough, most cows will take time out from grazing to feed on the hay. The dry hay not only puts a damper on the appetites for fresh forage but the dry stems tickle Bossy's stomach and causes belching.

Dr. Bolton also recommends a pasture mixture with grasses in it. Here again, the rougher grass is needed to cause belching to remove some of the gas pressure. Some agricultural experiment stations are recommending legume-grass mixtures, with the mixture containing half or more grasses.

Some herdsmen report less trouble from bloat when the herd is conditioned gradually to new pastures. They allow the cattle to graze perhaps only an hour the first day. The grazing time is ex-

Reprinted by permission from the New England Homestead, Springfield, Massachusetts, March 22, 1952

tended until, after a week, the cattle can stay on pasture the entire day.

And it's generally a good idea to keep the herd away from legumes that are wet from dew or rain because the additional moisture increases the chances for bloat. Also, Dr. Bolton advises keeping the herd away from water when they first come off pasture.

The animal pathologist believes that dairy cattle are more likely to end up with bloat than beef cattle. The reason is that beef cattle are on pasture the entire day during the pasture season. But dairy cattle are taken off pasture for several hours for milking. They build up an appetite at the barn and may overeat when they return to pasture again.

Bloat is unpredictable. Dairymen sometimes pasture legumes for years without a bit of trouble. Then, suddenly, they lose several animals. And some cows will bloat on almost anything they eat.

Keep a close watch on the herd during the pasture season, especially for the first week or two. If a cow becomes bloated—in spite of all precautions—call up a veterinarian right away. Prompt attention will save your cattle if bloat strikes your herd.

Penny Investment Nets $10,000 Loss in Few Minutes — When 15 ampere fuses blew in his wiring system, an Ohio farmer first replaced them with 30 ampere size. When they blew, he checked and could find no bare wires, then put a penny behind the fuse so he could finish the chores. In a matter of minutes, the barn was on fire. The fire department arrived to late to save the barn but the penny was saved and is now on exhibit in the window of the local electric company.

Baled Hay in Trench Silo — The idea of ensiling baled hay first tried by William Totman of Stoughton, Massachusetts, is attracting nationwide attention. He admits the idea was a matter of necessity. Last summer he was at his wits' end to get his summer crop ensiled on time. So in desperation he called in two custom hay balers. He baled both sudan grass and alfalfa. The bales were packed in his trench silo lengthwise, were tractor packed and piled six tiers high. For cover he used green weeds and a layer of sawdust.

There was little spoilage, he reported, this past winter when he opened the silo, and cows ate the material readily. It was just a matter of cutting the string or the wire with which the bales were tied and the silage came out easily. —*Massachusetts Extension Service*

Knowhow Raises Quality Beef

GRASS fed cattle going to market with a moderate finish may never top the market, but nine times out of ten they make the stockman the most for his investment. It is the natural way to grow cattle. Grass is a major link between the soil and man's food. It can be grazed directly, made into hay, or made into silage. Thus, grass offers a year round supply of forage or feed for meat animals.

In this still new era of scientific farming, vast improvements have been made in growing and preserving grass, and in breeding and managing the livestock that eat it. Cattle are able to convert forage into beef most effectively when proper management methods are used.

Western farmers and ranchers have boosted their total meat output by over a third in the past 25 years. Researchers of the United States Department of Agriculture and 12 western state experiment stations say two practices cattlemen have adopted have been mainly responsible for the gains. First, cattlemen over a period of years have cut down the proportion of 2, 3 and 4 year old steers in their herds and made a proportionate increase in breeding stock and younger animals. Second, they have increased the proportion of calves born and raised to a marketable age from an average of 70 per 100 cows to about 80 per 100 cows.

Know the Requirements

A successful forage management program requires that you understand cattle grazing habits. Cattle are selective in their grazing, choosing the best smelling and tastiest grasses. Under ideal conditions there should be a succession of new growth which will supply adequate amounts of desirable forage over a long grazing period. In many areas this can be done by growing pasture mixtures, or in rotating permanent pastures with cultivated grasses.

The cow's digestive system is well designed for the job of consuming large quantities of forage and putting it to profitable use. The alimentary tract is large—so large that a grown cow can hold from 120 to 180 quarts in her four stomachs. To fill them she will eat 100 pounds or more of green grass daily when the pasture is good. In addition, she requires from 10 to 15 gallons of water.

Normally cattle spend about an equal number of hours of the day grazing, chewing the cud, and resting. If the supply of forage is short, however, more time will

have to be spent grazing at the expense of the other necessary activities.

Supplements Often Necessary

Salt and, in some areas, other minerals are required by grazing animals. Most grasses are low in sodium and chlorine so that salt must be available from other sources. Phosphates head the list of other minerals which are most often needed. In limited local areas some of the so-called trace elements such as cobalt and copper must be added. These can readily be supplied by mixing them with salt.

The feed consumed by cattle supplies energy and heat and is built into body tissues. Young grass is high in protein, minerals and vitamins, thus supplying the necessary food elements. As the plant matures, its protein content decreases, and supplemental protein is often necessary during the late growing season. Usually this is provided by feeding oil meals or cake. The feeding of only one or two pounds a day per head usually will maintain gains when the forage is still plentiful but of low protein content.

In some areas of the United States, cattle two years old or older can be fattened for market as slaughter cattle (instead of feeders) on grass alone. In many grass areas, the strictly range areas excepted, cattle can be fattened profitably by feeding a grain supplement. Fattening cattle on grass usually requires about one-half as much grain or cencentrates as you need for strictly dry-lot fattening. Experiments have shown increased gain, finish, dressing percentage and profit from the feeding of grain to fattening steers on pasture. Other experiments have shown that well wintered steers and heifers can be put into good marketable condition at about 16 months of age if they are given concentrates to supplement good pasture.

Here is a check list of things to do to make your cattle production more profitable:

Plan a sequence of pastures in order to have good quality forage available for as much of the year as possible.

Provide water near the grazing areas.

Keep salt available at all times, and other minerals if needed.

Supplement matured grass with protein, especially in the winter time and in dry periods of the late summer and fall.

Use grain to supplement pasture for fattening to a marketable condition.

—Colorado A & M News

Why I Believe in Soil Conservation

Condensed From Soil Conservation

Susan Myrick

Associate Editor, Macon (Georgia) Telegraph

"BRED and bawn in de brier patch" in Baldwin County, Georgia, I grew up on a plantation, land which had been in our family for more than a century, so my roots are deep in the soil. My earliest recollection is that of riding behind my father on the horse as he rode over the plantation supervising the work of Negro tenants.

I remember how my father rotated crops even in that day when Cotton was King in the South, how he read farm magazines and tried to follow "new methods" in agriculture, and how he always had a rye patch for the Jersey cow and a green range for the chickens and oats for the hogs' grazing.

But the boll weevil came, sending much of the southland into economic chaos.

My early life is tied closely to the land, and agricultural economics is something I learned the hard way. It is natural, then, that I should follow closely the story of progress on the Georgia farm and find pleasure in the improved standard of living for the farm family.

That progress, I believe, is due to a number of things: 4-H Club boys and Future Farmers of America have grown up and started farming, putting into practice some of the scientific knowledge of agriculture they have acquired; the exodus of the Negro laborer from the Georgia farms has forced the white farmer into more intensive cultivation and the use of farm machinery; and government aids have enabled the farmer to finance his farm program.

About the time those things were happening, came the founding of the Soil Conservation Service and the soil conservation district. Farmers became conscious of the fact that Mr. Doe, a few miles down the big road, was producing higher yields and earning a higher income than Mr. Roe, who lived up the road a piece.

Why?

Because a "new fellow" in the county, a work unit conservationist, was helping Mr. Doe to

Reprinted from Soil Conservation, Washington, D. C.

follow a mapped plan of land use. Because Mr. Doe had planted cover crops, terraced fields, sodded waterways, followed good rotations; because Mr. Doe was a soil conservation district cooperator—a conservation farmer.

So, other farmers began getting plans on their land, learning about land classes, using their acres according to their capabilities, and treating them according to their needs.

During the past 10 or 12 years in Georgia I have seen changes in agriculture that I can scarcely believe, even when I see the results. Where once were gullied, tired, rundown acres, grasses and legumes grow and herds of cattle graze; where bare soil in peach orchards once washed steadily away, pastures now flourish, the peach trees pulled up and destroyed; where cotton once followed cotton on the same acres year after year, small grains, legumes, lespedezas and clovers are now rotated; peanut lands, once washed and depleted, are now covered each winter with blue lupine that provides nitrogen and a great load of green manure.

During the past decade, I have seen farmers and their families come to enjoy the comforts that the city dweller takes for granted. And most important of all, I have seen them acquire a new dignity and a new happiness by reason of improved economic status.

I cannot say that soil conservation alone has brought these fine things; higher prices, PMA payments, the REA and the FHA, experiment stations with their research workers—many factors have aided the lot of the farmer. But no other one thing has made so great a contribution to his welfare as the soil conservation program.

As farm editor of the Macon Telegraph and News, I visit three or four farmers each week, and farmer after farmer tells me of his increased yields, more fertile lands, and better income resulting directly from his soil and water conservation farming.

How does it happen that a woman is a farm editor? Some five years ago, publisher Peyton Anderson asked me what I considered the greatest service the two newspapers could render their readers. Since a large part of our circulation (about 52,000) lies in small towns and villages and rural areas, and since agriculture is the major source of income in our middle Georgia area, we decided upon agricultural promotion. And soil conservation was the phase of better farming we decided upon as of most importance to both farm and city man.

My first enthusiasm for conservation came, I think, from reading Stuart Chase's "Rich Land Poor Land," about 1936. I have

been a regular reader of Russell Lord's "The Land" for a long time, and I was sold on conservation.

So, publisher Anderson said for me to go to it with conservation promotion and a farm page and whatever I thought wise.

On our farm page each Sunday, and in our daily papers now and then, we tell stories of farmers who have made better yields and higher incomes because of their soil and water conservation practices; because they have put steep lands into pastures or trees, because they have rotated crops and added organic matter to the soil by the use of cover crops and litter, because they have terraced those fields which needed terraces and slowed the water down to a walk through meadow strips; because, in short, they are following the plans set down for their farming program by the Soil Conservation Service.

The newspapers have promoted an educational program in the schools in this area.

Such schools as enter the contest work for points; 1,000 points out of a possible 1,500 will earn a trophy for the school. Points are awarded for seeing conservation movies, reading and discussing conservation bulletins, writing essays or poems or slogans on conservation, presenting school programs with conservation for the theme, making scrapbooks on conservation in their own communities, and interviewing farmers on conservation practices.

Working with the education program, I found a dearth of conservation material for school boys and girls; most bulletins are too technical for the seventh or eighth grader's understanding. I began to think of writing a textbook on conservation. Then I decided that conservation education should begin in the primary grades; so I wrote "Our Daily Bread," a third grade social science reader with conservation as its theme. It has been adopted by Georgia and North Carolina school systems.

I believe in conservation. Fashioned of the soil, man has, through the ages, depended upon the soil for his existence.

Conservation of soil and water is our most important duty, for soil and water and their products are vital to the survival of civilization.

Want ad in country daily: "You who picked up my billfold at the auction Saturday was recognized. Please return it at once." Answer in the next day's paper: "Recognized man who picked up your billfold requests you call and get it."

Farmers Report on Hay Crushers

Chan Connolly

Condensed From Successful Farming

HOW GOOD are hay crushers? Many farmers, in search of better ways to make hay, are asking that question. The answers are a little slow in coming because hay crushers still are fairly new. But 18 farmers in northwest Ohio are sold on crushing their hay.

These 18 owner-operators have a total of over 10,500 acres of hay and straw-crushing experience. Visits were made with each of these farmers. What they have to say may help you decide whether a hay crusher would fit on your farm.

The first thing these farmers mentioned was adequate power. The power needed for mechanical hay crushing depends upon the design of the crusher. Heavy two or three plow tractors are best for the offset crusher. With this type, the hay is crushed as it's mowed. As the crusher follows the mower, offset crushers have considerable side draft. Two plow tractors are satisfactory for the trailer type crusher, which follows directly behind the tractor, crushing the previously mowed swath.

Under ideal conditions, a hay crusher may cut and crush nearly as many acres daily as an ordinary seven foot power mower. With less favorable conditions, capacity may decrease to 60 or 70 per cent of that of the cnnventional mower. Weeds and foreign material cause plugging of the rollers. This results in decreased crushing capacity.

All operators agree that crushers work best in hay of good length that is not down or tangled. Short hay has a tendency to bunch. Some operators find that hay crushers operate best on cloudy days, or after dew collects on the crop.

Crushers do the best work in alfalfa, alfalfa-clover, alfalfa-clover-grass, or clover-grass mixtures. In general, the coarser the stem, the more drying time is saved by crushing. The more mature the hay becomes, the less drying time is saved by crushing.

Some hay crushers do not work well in extremely tall hay, such as a mixture of Sudan grass and soybeans. Neither do some crushers work well in a mixture having

Reprinted by permission from Successful Farming,
Des Moines, Iowa, June, 1952

a high percentage of Ladino clover.

The 18 owner-operators felt that hay crushers offer three important advantages: First, a crusher will save drying time in the field. Second, crushing will materially decrease leaf loss in the field. And third, crushing lets you harvest better quality hay, retaining more of the essential nutrients.

According to Dr. L. A. Moore, Bureau of Dairy Industry, USDA, it requires an average of 72 to 82 hours to sun dry hay for the mow. It takes from 18 to 48 hours of open air drying before hay is ready to put in the barn for final drying with forced air. Crusher operators believe this time can be reduced 30 to 50 per cent with the use of hay crushers.

This time element, of course, decreases the weather gamble in haymaking. The normal practice for those who use crushers is to cut and crush one day — then bale, chop or put up loose the next day. When ideal drying conditions exist—or when mow dryers are used—hay may be baled, chopped or put up loose on the same day it's crushed. Hay mixtures with a large percentage of Ladino clover may require from one to two days longer.

Without exception, all owner-operators noted a substantial decrease in field leaf loss after using a crusher. Paul Jennings, McClure, Ohio, stated that the leaves on crushed hay seemed to be glued to the stems. This statement typifies the feeling among the other operators. Leaf loss is also reduced in baling, as compared to uncrushed hay.

Roscoe Zeigler, Maumee, Ohio, who owns a hay crusher and pick-up baler, says he could tell whether or not hay was crushed by observing the leaf loss from the baling chamber. Most operators believed their field loss was reduced 50 to 75 per cent by crushing.

All 18 farmers stated that crushing helped to improve the quality and palatability of the hay. The hay had better color and more leaves. Jerome Jewers, Ottawa, Ohio, stated that crushing made his first cutting alfalfa equal in quality to the second cutting, second cutting equal to third, and third to fourth.

Crushed hay stays greener and fresher in storage. As 30 to 50 per cent of drying time in the field is saved, crushed hay is much greener with a higher vitamin A content. This was borne out by Blaine Segrist, Wauseon, Ohio, dairyman, who said his Guernsey milk color rating doubled when he fed crushed hay. The result was a larger milk check.

Due to the higher per cent of protein in hay leaves as compared to stems, the saving of leaves

makes for a higher protein content in crushed hay.

The higher protein content was noted by Guy Cape & Sons, Edgerton, Ohio. The Capes' dairy herd dropped in production when the cows were turned out on pasture in the spring after being fed crushed hay in the winter. Three out of four large dairymen in this survey had the same experience. Cape reported a decrease from 12½ to 10 cans of milk, plus a decrease of 0.3 per cent butterfat, when cattle were turned out in the spring on good clover pasture after receiving crushed hay all winter.

Dairyman Ray Hartman, Bryan, Ohio, had a herd average of 367 pounds of butterfat the year before feeding crushed hay. After feeding crushed hay, Hartman's cows averaged 512 pounds of butterfat. The cows averaged this in spite of the fact that Hartman fed 100 pounds *less* protein supplement per 2,600 pounds of concentrates.

Hartman attributes at least half of his increase to his hay crusher, the other half to better hay than the previous year due to more favorable weather. Other dairymen noticed it was more difficult to get cattle to consume the usual amount of grain when feeding crushed hay. But they got more milk from feeding crushed hay.

Ralph Nussen, Allen County, Ohio, claimed that young dairy heifers looked better in the spring when fed crushed hay through the winter. Furthermore, he quit feeding grain.

L. S. Nofziger, Archbold, Ohio, says his steers cleaned up crushed hay much better than uncrushed hay. This was noticed by other feeders, too.

Twelve of the 18 operators did a very limited amount of custom work with their crushers. The remaining six did none. One operator charged $2.50 per acre; the others charged from $3 to $3.50. Practically all those who did custom work do not wish to continue it. Hay crushing comes at a peak labor period on the midwestern farm. Corn is ready to cultivate, beans must be planted, and hay must be harvested.

Paul Schaffer said he lost $2 to $3 at home for every dollar he took in by crushing hay away from home. One owner purchased a crusher with the idea of doing custom work to help pay for it, but he found that the demand for custom work was limited. In general, farmers are not yet acquainted with the performance and advantage of hay crushers, and therefore are not asking for them.

Because most crushers have been purchased since 1948, information on their useful life is incomplete. One machine, purchased new by a hay dealer in 1948, crushed 3,000 acres of hay,

and was sold in 1950. According to the owner, the mower part of the crusher was completely worn out. He thought that if the mower had been repaired, the crusher portion of the machine would probably last another 1,000 acres.

Owners were asked to estimate the normal useful life of a crusher, in terms of acres. Estimates ranged from 2,000 to 4,000 acres. Of course, the life of any machine depends much upon the operator and proper maintenance. Maintenance problems of hay crushers varied widely in this survey. However, there were some problems common to all operators of the same design of crusher.

The most serious maintenance problem on the offset design crusher was that of decreasing bar lag. In early models, there is no adjustment for either the cutting bar or cutting bar yoke in relation to the pitman. In later models, an adjustment of the cutting bar yoke in relation to the pitman was incorporated in the mower. But no provision was made to adjust the cutting bar in relation to the yoke and pitman. Operators of all offset crushers with 500 acres of experience had this cutting-bar-lag problem. Cutting bar lag varied from two to six inches. One operator heated and bent the large dragbar on which the cutting bar yoke is mounted to obtain the proper lead in the cutting bar. Out - of - adjustment cutting bar lead on the offset crusher creates unnecessary side draft and consumes extra power.

The main problem with the trailer design crusher is the breaking of pickup teeth on the right end of the pickup. All operators of this design of crusher experienced this problem.

The total amount spent on repairs for the 18 crushers in this study was $1,130 for 10,510 acres of work. This made the average repair cost 10 cents per acre. One crusher was operated by hired help in fields with washouts. The hay was mostly an alfalfa-Ladino clover mixture with a high percentage of Ladino. Because of these conditions, the repair cost on this crusher was $1 per acre.

There are wide differences of opinion as to the effect of dew or rain on crushed hay, as compared to uncrushed. Most operators observed that crushed hay absorbs dew or rain quicker. But they say it also dries faster than uncrushed hay. Crushed hay can normally be baled earlier in the morning but not as late in the evening as uncrushed hay.

Many operators observed that crushed hay deteriorates faster when rained on several times, especially if the hay has dried before becoming wet. One operator noticed that crushed alfalfa stems seem to pop open when wet, making the hay look bad and lose color. Most crusher operators

think that there is very little, if any, more leaching in crushed hay than in uncrushed.

Half of the operators stated that crushed hay made heavier bales, adding from 5 to 15 extra pounds per bale. In round bales, they couldn't see much difference in weight. Crushed hay seems to feed better in all types of bales. Two operators said that in over-dry crushed hay, the bales were lighter than those of uncrushed hay.

The weight of wheat and oats straw bales is materially increased, according to the two operators who used crushers on straw. They said straw fed better into balers when crushed, absorbed more moisture in the barnyard, and rotted faster.

In general, operators feel that there should be a minimum average volume of 100 acres of crushing per year to justify the expense of a $2,000 crusher. And the hay should be fed by the operator. Fifty acres of alfalfa cut twice a year for hay would make this volume.

The initial cost of crushers is high, compared to that of other machinery. A well engineered crusher which would sell for $1,000 or less could be used to advantage on many smaller farms having livestock programs and 50 acres of crushing per year. Implement manufacturers are now working on crusher designs in this price range. No doubt many farmers will find a place in their farm programs for such a crusher.

Farmers Buy on Time — From a section of the country not considered a good area for credit sales to farmers comes a report that 75 to 80 per cent of purchases from mail order farm stores are on a time payment basis. Usual terms are 10 per cent down and 10 per cent a month.

"Our stores would have to close if we couldn't offer this service to farmers," store managers reported.

You might think time payment buying would be more suitable for city wage earners who receive a regular wage at fixed intervals, but farmers are apparently no different from city folks. In fact, they have some advantages for installment buying. If funds run low, they can market a pig, heifer or other asset to cover several monthly payments. City wage earners don't have such easily converted property and probably run much lower bank balances, merchants believe.

—*American Lumberman*

Farm Assembly Line

Lloyds' Farm Covers All Phases of the Turkey Business From Hatching to Cooking

Condensed From the Turkey World

PRODUCING 14,000 marketable turkeys with a mortality rate of only two per cent sounds incredible. However, this feat has been achieved by Lloyd's Indian Oaks Turkey Farm, Whitehouse, Florida, by virtue of a three-pronged attack. Poults are brooded on wire floors; both live steam and commercial disinfectants are employed in cleaning brooder houses; and poults are prepared for the range in conditioning houses shielded against rain but admitting sunshine.

Poults remain in the 5,000 capacity, 120 feet long and 30 feet wide brooder house until they are 12 weeks old. The use of live steam in cleaning this building is estimated to kill 90 per cent of the germs, and commercial disinfectants bump off the remaining 10 per cent. Sunporches attached to the brooder houses are 12 by 12 feet in dimensions. The range conditioning houses — and there are eight of them—are 90 feet long and 32 feet wide each and they put the young birds in fettle for the open range. "In these conditioning houses," we are told by Bill Lloyd, "poults get everything but the rain—plenty of sunshine, fresh air, light and other range conditioning factors." These conditioning and sanitary practices add up—or shall we say subtract—to the unbelievable death rate of only two per cent between the brooder house and slaughterhouse.

Lloyd's Indian Oaks Turkey Farm and Hatchery (so named because of the presence of 16 giant, moss festooned oak trees, some 7½ feet in diameter) has another claim to distinction. Hatchability of turkey eggs maintain an average peak of 70 or 75 per cent, sometimes running as high as 81 per cent. The Lloyds are ready with reasons for this hatchability percentage. First, hatchery eggs are carefully selected; second, eggs are gathered six or seven times a day; and, third, hatchery eggs are cleaned and deposited in a specially built cooling room, gauged at 50 to 55 degrees Fahrenheit, until they go into incubators. A close watch is

Reprinted by permission from the Turkey World,
Mount Morris, Illinois, March, 1952

kept on incubators. The Lloyds have two incubators of 10,500 and 18,500 capacity, respectively, and the purchase of another, with a capacity of 24,000 poults, is contemplated. The structure housing the incubators is 30 by 30 feet in size.

From hatchery to slaughterhouse, Lloyd's turkey operations are completely self-sufficing. On the 120 acre, fenced in farm there are a total of 66 buildings, including a 12 by 24 foot quick freezing plant; a 12 by 12 sales room; a 24 by 60 foot feed room detached from other structures; a 30 by 60 killing plant (with larger dressing facilities in prospect for 1952); and a so-called "summer house." This is an open air but screened barbecue pit where Mr. and Mrs. Lloyd serve barbecued turkey. They also barbecue turkey for commercial distribution.

The Lloyds do not raise turkeys strict confinement. They follow the routine of most other commercial turkey operators, that is, shuttle the birds onto open ranges at about 12 weeks old. On the Whitehouse farm, however, one does not find a combination of pastures or even oats. Instead, the Lloyds prefer hegari for its dual purpose of forage and shade. Rotation of grazing land is practiced, and turkeys on range are moved weekly to avoid contamination from droppings. And, as a further sanitary precaution, the soil on which the birds graze is plowed under periodically. Some of the turkey droppings are hauled away by tractor and manure spreader and are distributed on a pasture kept exclusively for a small herd of purebred Brahman beef cattle. Floors in the turkey houses are in sections and turned upside down and the droppings loaded onto a manure spreader.

Although Bill Lloyd is president of the Florida Turkey Association and is conventional in examples he sets for fellow turkey grower members, he does not subscribe to the usual feed formula of 100 pounds of commercial feed to produce to maturity, or 28 weeks old, a Broad Breasted Bronze. He doles out only 86 pounds of feed per Broad Breasted Bronze and 65 pounds per Beltsville White, to maturity, or from 22 to 24 weeks old. Lloyd insists that "a lot of feed is wasted by letting it get wet and other careless practices."

Some of Lloyd's turkeys are sold at his quick freezing unit, but most of them are hauled to Jacksonville, 12 miles away, where he has a dependable and profitable outlet in chain grocery stores and other wholesale purchasing agencies. Birds are packed in individual corrugated, ventilated boxes, with the words, "Lloyd's Fancy Turkeys," im-

printed thereon. He finds an easier market for Beltsville Whites than Broad Breasted Bronze, and for that reason he grows at the ratio of 10,000 of the small turkeys to 4,000 of the larger birds. He has also found a ready market for Beltsville White broilers, killed and marketed at 12 weeks old, when they average from 3½ to 4½ pounds dressed. These broiler poults are kept on wire floors and with sunporches accessible, until 12 weeks old, requiring about 15 to 21 pounds of feed for each broiler. They are marketed through retail outlets and local chain grocery stores.

The Lloyds realize a net profit of around $2 per mature turkey and in addition to growing between 14,000 and 16,000, they handle turkeys raised on other farms. Their total marketings approximate 30,000 birds annually. "Put up your marketable birds in a presentable package," is the advice of Lloyd, if you are slanting your trade toward chain stores and other wholesale outlets. Although he is doing some retailing, he is gradually edging out of the retail picture.

In addition to invaluable assistance from Mrs. Lloyd, he retains in his regular employ two men and one woman. At the peak of his trade—from September 1 to January 1—he hires about 30 women to kill and dress turkeys.

Bill and Rosetta Lloyd ventured into the turkey business when their son, Billy, Jr., then 3 years old, asked them for "a couple of turkeys to start a flock." That was in 1943 or eight years ago. Bill, Sr., was then an automobile mechanic in Jacksonville and knew as much about turkeys as a farmer would know about running the Bethlehem Steel Company. The Lloyds had only $112 in the bank, but they drew out enough to buy 10 birds. They lived in the city limits, only 20 blocks from city hall, and really began raising turkeys on an adjoining vacant city lot.

They later bought a rundown chicken farm at Whitehouse, with 120 acres. The Lloyds have an attractive sign, 4 by 10 feet, on highway U. S. 90, with an acorn as a symbol. Also, they circulate small buttons, something like political campaign buttons, with a turkey and acorn imprinted thereon. These buttons are attached on the wings of every turkey sold as a trademark. Their stationery carries the insignia of a turkey with an oak leaf in the background and the words "Lloyd's Fancy Turkeys."

Except for commercial feedstuffs, the Lloyds produce everything on the farm—from hatching eggs to marketing ideas, from dressing plant to salesroom, from poults to barbecue pit. They ship poults as ar away as Puerto Rico, Cuba, and Bermuda. They main-

tain a large flock of breeder hens.

Lloyd's Indian Oaks Turkey Farm and Hatchery is run like a factory assembly line. The modern "factory" facilities complete the cycle of operation, including bleeding, s c a l d i n g , plucking, washing, dressing and packing—all in the brief time of a few minutes. Such is the skein of the story of a 3 year old boy's interest in a turkey, a plot of earth in a city of 300,000 population where a few turkeys gobbled on into the countryside on a 120 acre farm, where 14,000 turkeys are raised and 40,000 poults hatched annually.

Bill Lloyd has become a master turkey raiser and president of the Florida Turkey Association without as much as a high school education and without previous experience as a turkey grower.

Feeding Prospects Look Better for Hog Raisers

The ratio which shows how many bushels of corn are equal in value to 100 pounds of live hog now indicates that prospects are becoming better for hog production. Robert C. Kramer, Michigan agricultural economist, points out that the cost of producing 100 pounds of live hog compared with the selling price now leaves some profit. But he says that several factors indicate this relationship will become even better by this fall.

Soft corn and a "short" crop has made the price of corn higher during the past six months than a year earlier. Hog prices have averaged a little lower than a year ago.

The annual pig crop in the United States has increased since 1946, reaching a total of 102 million head in 1951. So prices have broken and indications are that the downward phase of the hog production cycle has begun. This downward phase of the cycle should last only two or three years. Beginning this summer, the number of hogs slaughtered will reflect the smaller pig crop this spring. Prices will rise this summer and reach a peak in August or September, Kramer believes.

He says that figures indicate farmers should plan now for fall and winter litters. Hogs will become relatively more profitable. If we have a normal corn crop this year, 1953 should be a good hog year. So, if you are an efficient hog producer, stay in the hog business. — *Michigan State College*

Science Looks at the Cow — as a Converter of Roughage

Marshall E. McCullough L

Animal Industry Department

Georgia Experiment Station

Condensed From Better Crops With Plant Food

RECENT estimates have shown that about 125 million acres of land in the United States are devoted to the production of pasture and hay. The entire acreage would be useless to man were it not for the ability of cows and sheep to convert it to meat, milk and wool.

Of all conservation practices, none is more effective than the planting of the land in grass and legumes. If this system of "Grassland Farming" is to be successful, a more thorough understanding of the functions and use of cows and sheep must become a reality.

The four compartment stomach of the ruminant (cow - sheep - deer) sets it apart from other members of the animal kingdom chiefly due to its ability to utilize fibrous feeds such as pasture, forage, hay, straw and silage. Of primary significance in this ability is the presence of the largest compartment (rumen) at the head of the digestive tract. The rumen of dairy cows varies in its capacity from 40 to 65 gallons, depending upon the size of the cow and the nutritional history of her early life. Essentially, the rumen functions as a fermentation vat where the food materials coming from the mouth undergo a period of fermentation during which the nutrients are converted to a form more useful to the animal.

Connecting the rumen with the small intestines (the site of most food absorption) there are three compartments called the reticulum, the omasum and the true stomach. The function of the second and third compartments is not fully understood. The reticulum is best noted for its tendency to collect such foreign objects as nails, wire, stones and such other objects as the cow may pick up in grazing or eating in the barn. The third stomach presses the food and removes a large portion of its water, but this function has not thus far been

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shown to be of any special importance. The true stomach, or abomasum, serves the cow as the stomach of any other animal. The first secretion of enzymes occurs here and apparently what is called true digestion begins for the first time.

The location of the rumen at the beginning of this system has the advantage that the materials synthesized there may be absorbed by the animal. Most nonruminants have some fermentation in the lower digestive tract, but the fact that it occurs so late in the process prevents it from being of any great value to the animal.

In recent years much interest has been created in the exact mechanism of this fermentation process which makes the cow a good user of roughage that has no food value to man, and enables her to convert it into meat and milk.

The food and water consumed by the cow pass directly to the rumen where they are attacked by microorganisms and fermentation begins. The length of time required for fermentation or breakdown of the roughage depends upon the type of roughage. The completeness of fermentation is apparently determined by the presence or absence of certain compounds such as lignin and the species and number of microorganisms appropriate for the roughage being consumed. Increasing amounts of lignin, as found in more mature pasture herbage and hays, prevent other compounds such as cellulose from becoming accessible to the bacteria. The absence of sufficient carbohydrates, protein and/or minerals to stimulate the rapid growth and activities of the bacteria may also be a limiting factor. Each type of ration (hay, hay and grain, or pasture) seems to require a characteristic flora for its most efficient utilization. Thus, the common observation that it requires a period of time for cows to become adjusted to a new ration may be explained by this fact.

The fermentation process. Although scientists in many countries have become interested in this process within the last decade, many questions have either not been studied or remain unanswered at this time.

Cellulose. Perhaps the most striking result of the rumen activity is the conversion of cellulose (measured as crude fiber) into short chain fatty acids—chiefly acetic, propionic and butyric, and the gases — carbon dioxide and methane.

This process is amazingly fast (about 6 to 8 hours) and quite efficient. With the rapid production of these acids the pH of the rumen contents would be expected to fall to a very low level

and the fermentation process to cease. Such a condition is prevented by the buffering effect of the phosphate and bicarbonate of the saliva. As a further aid to the prevention of a high acidity, a great proportion of the acids are absorbed into the blood stream through the rumen wall.

The process of conversion is greatly aided by frequent regurgitation of the rumen contents into the mouth for mastication. This process commonly called "cud-chewing" is of great importance since it breaks much of the fibrous material into smaller particles and exposes a greater surface area of the food to attack by microorganisms.

Other carbohydrates. The fate of the sugars and starch in the rumen has been the subject of much debate in recent years. Simple sugars such as glucose placed in the rumen disappear at a very rapid rate. Most workers agree that this indicates that the bacteria use such compounds as a source of energy for their rapid growth. It should be emphasized, however, that the dividing line between enough and too much readily available carbohydrates is a narrow one. Recent work in England has shown that the greatest cellulose digestion occurs when there is 0.1 or 0.2 per cent sugar in the rumen, either more or less being inhibitory. It can be assumed that this small amount of sugar stimulates rapid growth of the bacteria, and cellulose digestion results when other readily available sources of energy are expended. The addition of large amounts of molasses to hay has frequently been found to reduce crude fiber digestion and can probably be explained on this basis. This phenomenon may best be explained by saying that the bacteria use the more readily available sources of energy first and attack the cellulose only as a last resort.

Protein. The rumen bacteria apparently convert much of the nitrogen in the ration into bacterial protein for their own growth and development. The many successful uses of nonprotein nitrogen such as urea in rations for dairy cows point to this ability of the bacteria. Since this fact has been demonstrated it explains why it is generally unnecessary to consider the quality of protein in dairy cow rations. The upper limits at which the cow is able to use urea have not been fully determined. It remains necessary, therefore, to provide a large part of the nitrogen as protein, although its source is of little significance. A very interesting cycle is involved in this protein hydrolysis and the breakdown of cellulose. The bacteria utilize a great deal of urea in the cellulose breakdown. To supply this, a portion of the ammonia coming from

the protein breakdown is carried in the blood to the liver where it is converted into urea. From the liver, the urea is carried back to the salivary glands where it becomes a part of the saliva and is in turn added to the rumen contents as an aid to the cellulose breakdown.

Synthesized factors. As by-products of rumen activity, many dietary factors are produced and used by the cow. A few of the factors synthesized in the rumen are: Vitamin K, thiamine, riboflavin, niacin, pantothenic acid, biotin, fat, carbohydrate (starch-like compound), protein from nonprotein nitrogen, and unknown dietary factors. Because of this synthesis, it is unnecessary under ordinary conditions to give consideration to supplying the cow with any extra vitamins in her ration. While vitamins A and D are required from an outside source, good quality hay or pasture forage will more than meet her vitamin A requirement, and a few hours in open sunshine will take care of the vitamin D needs.

Fate of the products of digestion in the rumen. The products of rumen fermentation may leave the rumen by three channels: They may pass up the esophagus to the mouth; they may pass to the lower digestive tract; or they may be absorbed into the lymphatic and blood streams.

Earlier reference was made to the passage of food back into the mouth for further mastication and its importance to the fermentation process. Many of the gases go out by this route, although some absorption also occurs.

The material going to the omasum consists of food residues and microorganisms suspended in a solution which contains minerals, fatty acids, vitamins and ammonia. The subsequent digestion and absorption of these materials provide the cow with the nutrients needed for maintenance, growth, reproduction and production.

Acetic, propionic and butryic acids are absorbed into the blood along with some carbon dioxide and ammonia. Of the acids absorbed nearly 80 per cent consist of acetic acid, most of which is removed by the udder for use in milk production.

Summary. We have seen how the cow with her large fermentation vat and billions of microorganisms is able to consume roughage and convert it into milk and meat. This process remains one of the marvels of nature and has only recently come into its rightful place in the field of scientific investigation.

Cornstalks Decrease Yields

Myron A. Bachtell

Condensed From Ohio Farm and Home Research

CORNSTALKS rather suddenly have become a problem on thousands of U. S. farms. Modern mechanical corn pickers permit the corn crop to be harvested in a fraction of the time formerly required for cutting, shocking and husking, but leave cornstalks in the field where their influence may be both good and bad. They tend to exert a stabilizing effect on the long-time fertility level, but they also temporarily retard the growth of wheat or oats harvested the following year.

Cornstalks contain about 50 times as much carbon as nitrogen and are classified as carbonaceous material. This is in contrast to leguminous plants where the carbon-nitrogen ratio may be as low as 12 or 15 parts of carbon to one part of nitrogen. Cereal straws, and even that from the soybean seed crop, have nearly as wide a carbon-nitrogen ratio as cornstalks. This difference in carbon-nitrogen ratio explains why crop growth may be depressed by plowing under cornstalks and stimulated by legumes.

Bacteria Causes Decay

Decay of either material is caused by bacteria. These tiny and very active organisms can't multiply and work without nitrogenous food so a competition for nitrogen develops between them and the growing crop. Clover residues and the soil may contain enough nitrogen for both purposes. Cornstalks have so little that conditions are likely to prevail where either bacteria or growing crops fail to get all they need. When this occurs, crops are almost certain to lose. Reduced yields may result, especially on light colored soils where the nitrogen supply is naturally low. Bacteria eventually die and release the nitrogen they have used but the crop has been deprived of its use during a critical period in its development.

The livestock nutrition investigator studying the feeding value of corncobs, and the agronomist checking the fertility value of cornstalks find a parallel situation. The efficient digestion of corncobs by ruminants depends on supplemental feeding of nitro-

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gen (in protein) and efficient utilization of cornstalks requires nitrogen feeding of the bacteria causing decay of cornstalks. With an adequate supply of nitrogen, a certain amount of stable humus is formed when cornstalks decay. An inadequate supply produces mostly water and carbon dioxide, both of which escape into the air without any lasting benefit to the soil in which the decay occurred.

Three Methods Used

In farm practice there are three methods of supplying nitrogen for the better utilization of carbonaceous residues. When livestock are fed considerable nitrogen from leguminous forage the high nitrogen content is secreted in the urine and becomes mixed with the carbonaceous bedding materials. This is the first method under consideration but it applies less to cornstalks as more of that part of the corn crop is left in the field.

The second method of supplying nitrogen for more efficient utilization of unremoved cornstalks is to rely on the remnants of leguminous green manures or legume sods which still continue to undergo simultaneous decay with the cornstalks. Uncertainty in this source of supply is evident since the corn crop itself had first chance at the nitrogen from these leguminous sources. Added to this is the equally obvious fact that the cornstalks are going back to the soil soon after the corn has done a fairly efficient job of utilizing the more readily available nitrogen in the leguminous green manure crops and sods.

Oats yields on certain plots in the Sweetclover for Green Manure Test in Ohio indicate that remnants of legume sods or green manures usually do not supply sufficient nitrogen for the most satisfactory utilization of cornstalks. A corn-oats rotation is used in this experiment and on plots where no leguminous green manure has been plowed down for corn, oats yielded six bushels less per acre over a five year period where cornstalks and oats straw were returned than where residues were removed.

Oats Yield Reduced

In 1951 the reduction in oats yield was 14 bushels per acre. On plots where fair sweetclover had been plowed down as green manure for corn, loss in oats yield was cut to less than two bushels for the five year average and to nine bushels for the 1951 crop. In 1951, the early season was cool and wet, the color of the oats was poor and the yield was affected more than average by the greater ability of the bacteria to compete for the limited supply of nitrogen. Remnants of the leguminous green manure crop lessened the loss in oats yield but did not completely eliminate the ill effects of the competitive struggle for nitro-

gen between the oats and the bacteria of decay.

The third method of overcoming the depressing effects of cornstalks on the succeeding grain crop is the application of commercial nitrogen. This method was used in the Crop Residues Experiment which was conducted from 1926 to 1942. Rotation in this test was corn, soybean hay, wheat, clover. Although it contains two legume crops it is not a particularly good rotation from some standpoints. Crop yields were good (but not high) where all crops except wheat grain were passed through covered feeding pens and the manure returned. Where excreted nitrogen from digested legume crops did not get back in manure form and the cornstalks were plowed down prior to the soybeans their effect was negligible. The yields of other crops were neither decreased nor increased to any significant extent.

On certain plots in the Crop Residue Experiment the carbonaceous cornstalks and wheat straw were returned after having gone through the compost pile with as much nitrogen and limestone as was considered necessary for the production of artificial manure. On others, the same amounts of stalks, straw, nitrogen and limestone were plowed under without being previously mixed. Results from putting these materials into the soil separately were slightly better than from composting and practically as good as where the residues were used for bedding. Noninclusion of cornstalks in the winter livestock management plan does not prevent their profitable utilization but it does seem to increase the desirability of purchasing nitrogen.

Unfortunately, there is more evidence regarding the depressing effect of unbalanced carbonaceous materials than there is regarding the economic returns from properly balancing them with commercial nitrogen. A rather fine distinction and often a difficult one has to be made between the need for additional nitrogen that is caused by the return of carbonaceous residues and that which exists to supply the routine requirements of satisfactory crop yields. This latter need may be large because of a general inadequacy of the legume program or the sequence of the crop rotation. Because of this, application of commercial nitrogen justifiably may at times be much larger than amounts required to offset depressing effects of cornstalks or other carbonaceous residues. For this latter purpose alone, application of 20 pounds (or a little more) of nitrogen for each ton of carbonaceous residue is satisfactory. An acre application may result in the use of as much as 200 pounds of sul-

fate of ammonia or 125 pounds of ammonium nitrate.

Perhaps definite rules may never be formulated for use of commercial nitrogen on thousands of well managed farms where good over-all fertility programs have been in operation for varying periods of time. Rapidly made decisions of the farm operators must determine the use. Appearance of the crop often flashes the signal in time to permit needed applications to be made.

Conserves Potash

Cornstalks add materially to potash conservation. Two - thirds of the potash used by corn stays in the field with the stalks. Residue from an 80 bushel crop contains approximately 60 pounds of potash, an amount that compares with that in six tons of manure or in 300 pounds of fertilizer containing 20 per cent potash. A manure or fertilizer application of this size usually is suggested as desirable for a year of meadow. Returning cornstalks directly to the soil instead of taking them out of the field is a conserver of potash for the meadow crops following later in the rotation. Cornstalks conserve the supply of phosphoric acid to a lesser degree as about four-fifths of the total used goes out of the field with the grain. Residue from an 80 bushel yield contains seven pounds or approximately as much as is carried in 1.5 tons of manure. Combined value of these two nutrients at present fertilizer prices would be about six dollars per acre. Cornstalks should not be wasted but are not valuable enough to buy for use on land.

Cornstalks have an erosion protection value when they lie flat on the ground or have been partially incorporated into the surface by disking. In these positions they form thousands of contacts with the soil which guard against soil sealing and provide an easy entrance for water penetration.

Eggs Sold By the Pound instead of by the dozen, are advocated by poultry marketing experts. Consumers shy away from small eggs, not because they are less nutritive, but because they feel they get more for their money in large ones. The result is producers now receive, in many cases, only 50 to 60 per cent as much by weight for pullet eggs as for large ones.

Farrowing Crate Helps Save Pigs — Only 3.2 per cent of the pigs farrowed by sows in crates were crushed as compared to 8.1 per cent crushed by sows in ordinary pens with guard rails in a test at Kentucky Experiment Station. Sows were less nervous and required less attention when they farrowed in crates; were managed more satisfactorily with less time and attention.

Barnyard Listening Post

You Can Be Everywhere With a Farm Inter-Communication System

J. H. Bodwell

New Hampshire Electric Company L

Condensed From Electricity on the Farm

HAVE you ever wondered what the barnyard sounds like when you are not there? Recently I had a chance to find out. It was at the Sunanday Farm in Hampstead, New Hampshire. We were discussing labor saving devices for the farmer when suddenly I heard the bleat of a lamb — right in the kitchen. Then I heard a rooster crowing! Then there followed a medley of sounds from the sheep and poultry pens. I asked Mrs. Sunanday if I was imagining things at which she laughed and replied, "No, that is our intercommunicative system at work, and it does a three fold job. First, when the hired man is working in the poultry or sheep pens he can call in for further instructions without my leaving the house.

"Second, we keep the system operating constantly so that, even when no one is in the barns, we can tell by the sounds whether or not everything is okay. During the lambing season it is of inestimable value, as we have learned to tell from the bleating of the ewes and young lambs whether everything is under control. If not, we can run out and see what needs to be done.

"Third, it acts as a burglar alarm. Recently, one of our neighbors took her children to see the young lambs and I could hear their voices in the house. This was all right, as we like to have neighbors drop in. However, if it had been strangers we would have known immediately. There is always the possibility of a stray dog getting into the barn, too. Again, we would know immediately. It certainly saves needless trips to the barn, as I can tell what is going on without being there."

Mr. and Mrs. Sunanday are former city people. Mr. Sunanday works in near-by Haverhill, going back and forth to his work six days a week. That leaves it up to Mrs. Sunanday to handle and supervise the business. She says that although they will never get rich on the farm, they love it just the same. They work hard and get very tired at times, but it is worth it. As Mrs. Sunanday says, "When you work on a farm you know why you are getting

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24 W. 40th St., New York City, May, 1952

tired, but in the city we used to get tired without knowing why."

The Sunandays own 85 breeding ewes, with a total stock of 120. Of this number, 45 are pure bred New Hampshire stock and the rest are grades. Starting with seven sheep to keep the lawn mowed when they came to Hampstead six years ago, they have increased this number to the present total. Mr. Sunanday was president of the New Hampshire Sheep Breeders Association in 1951. They also purchased a few chickens and now have 1,000 laying birds.

For three winters they have used infrared lamps for brooding lambs and now have 12 heat lamps available at all times during this period. Mrs. Sunanday said to me, "Without these lamps at this time, the work would be very hard and we would be unable to save all the lambs during cold spells.

"Besides keeping the lambs warm, these lamps keep the litter dry and warm for the lambs when they lie down. Cold, wet litter is bad for the sheep business. These lamps are certainly great labor savers during this period."

During the winter months, the water pipes at the Sunanday Farm are kept from freezing by the use of heating tape. Poultry water warmers in the pens keep the water at the correct temperature. "One of our big surprises," Mrs. Sunanday said, "was the use of one of these water warmers in the big tub used by the sheep for drinking purposes. We hardly expected it to do the trick, but it has."

During the time I spent in the home, we could constantly hear the sounds from the barnyard. Mrs. Sunanday would say, "Now the hired man is collecting the eggs—do you hear him taking the buckets down to collect them? Now he is feeding the poultry pellets, I can tell by the noise of the birds rushing to get the pellets in the litter. Now he is in the sheep pen, as I can tell by the sound of his picking the hay from the manger."

This system can be used on six different stations, either separately or all at the same time. Selection is made at the master station. At present it is used on only two stations and is kept on most of the time so that what is happening in each section may be heard in the kitchen.

Carryover of Cotton in the United States August 1 may drop below the 2,300,000 bales of last August 1, which was the lowest in the last 26 years. Mill consumption is expected to total about 9,500,000 bales and exports about 6,000,000 bales. The supply for the season is estimated at 17,400,000 bales.

"Push-Button" Barn

E. L. Boutilier

Condensed From American Agriculturist

THE pole type pen stable barn on the Chernoff farm at Sangerfield, New York, is U-shaped and occupies three sides of a paved courtyard measuring 50 by 104 feet. It will accommodate 75 milkers. Dave Chernoff figures it cost $15,000, instead of an estimated $40,000 received on bids for conventional construction.

Besides the courtyard, the main divisions of the barn area are a hay storage and feeding barn (south side) measuring 117 by 42 feet; a loafing barn (north side) measuring 104 by 52 feet, and a combined milk house and parlor with bull pen (west end) measuring 24 by 50 feet. The concrete silo, 48 feet high and 16 feet in diameter, holds about 230 tons of corn ensilage.

Duplication of this barn by another farmer might involve greater expense. Dave saved $2,000 when he cut the cedar and hemlock pole supports from the woodlots on the farm.

The electrically controlled conveyor belt that distributes the corn ensilage is actually an adaptation of a gutter cleaner. The belt is of rubber and the cords of nylon. It extends 107 feet and is equipped with a reversible motor which permits self-cleaning after the cows have been fed.

The milking parlor is the pride of Chernoff and of his barn layout advisers, Ivan Bigalow, district agricultural engineer, and Ralph Hadlock, associate agricultural agent in Oneida County. Currently, the milking parlor accommodates eight animals, four on each side. Twenty-eight of a herd of 46 are now in production.

Cows walk from the loafing barn across the paved courtyard to the conveyor belt in the feeding barn, where they eat silage, and eventually go up cement steps to their places in the milking parlor. Gates drop to keep them in place while the gauge measured grain gives them an "after silage dessert" which keeps them contented.

In the pit located between the two stanchion-like sections, the milking lines are attached. Dave doesn't have to "stoop" because the cows are standing on concrete platforms raised 30 inches above the floor of the pit. The com-

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plete milking operation to the washing down with scalding water takes 45 minutes.

Among the advantages are reduced labor needs, improvement in herd health, increased cow comfort, and reduced chances of udder injuries and mastitis. And contented cows are producing more milk.

The pen type stable has eliminated the need for hauling manure on cold wintry days. It also conserves the fertility value of the manure and facilitates returning straw to the land.

Dave Chernoff says it is easier to keep his cows cleaner, his breeding troubles have been reduced, and his cows get more exercise. The comparatively inexpensive building costs should be of interest to those who contemplate starting a dairy enterprise.

Disadvantages have been minor to date. At first, cows used to the confinement of stanchions took advantage of their new freedom and participated in the damaging play of hooking one another. The remedy was dehorning.

Thirty-two year old Dave Chernoff took over the 450 acre spread formerly operated by his father, William Chernoff of Utica, and has carried out the Cornell developed system in every detail.

Outstanding features planned for increased efficiency, labor saving, and just plain convenience to the dairy farmer include: First floor hay storage, facilities for milking eight cows at a time, a concrete pit for the comfort of the milker, a side opening milk cooler, glass pipelines, sheltered feeding and loafing areas, a paved courtyard, pens for bulls and livestock, and easily attainable quantities of hot water for flushing and cleaning.

Dave admits, "I should have done it long ago."

I've gathered the facts for my income tax,
My worksheet is now filed away,
Now I'm off from my home to the bank for a loan,
Only thus am I able to pay.
As I worked on the sheet with confusion complete,
My thoughts were exceeding offensive.
I'd arise from my seat and would loudly repeat,
"To be governed is very expensive."

G. E. S.

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Lewis-Shepard Products, Inc., Watertown, Mass.

Spraying Apples for Less Money

Facts and Figures on Cutting Spray Costs

Tom La Mont

Condensed From American Agriculturist

SPRAYING is about 40 per cent of the cost of growing apples to picking time. The Cornell Cost of Spraying Survey showed that material is two-thirds of the spraying cost, and labor and equipment to apply it was only one-third. To date most of our attention has been on how to lower the cost of application. We should look at the big item—material cost.

This Cornell Survey showed that both the material and application cost per acre and per tree on the author's LaMont Fruit Farm were only a little over one-half that for the 114 farms in the survey.

Here's How We Save Time and Material

We nearly always spray one side at a time or in our double set blocks when it is quiet we drive through every other space with both sides of the sprayer open. With an air blast sprayer one covers a high proportion of the tree from one side. The earlier the spray the higher the percentage of the tree that is covered. Spraying the other side of the tree later increases the deposit of spray material on a large proportion of the tree.

After bloom we like to spray one side and then after three days spray the other side. This increases the time that a fresh spray deposit is there for killing moths.

The increase in spray deposit from spraying one side at a time means that heavy applications of spray are not necessary unless one has a heavy infestation of some pest. Even on 40 year old trees we use only 10 to 15 gallons to a tree, or five to eight gallons to a side.

Another way to cut material costs is to use the cheapest material that will do the job and apply it on time. We use magnetic 70 through the first cover spray with some lime sulfur during the green tip or delayed dormant. The magnetic 70 is applied ahead or during rains, and before bloom. One side is usually sufficient. This is much cheaper than applying a more expensive ma-

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terial after the rain, when a thorough application from both sides is necessary.

Don't Wait

The cheapest way to control scab is to do it early in the season. One application then may save a number of applications later. Another important point is to cover the scab susceptible varieties, such as McIntosh, first.

Reducing the amount of spray applied also cuts the application cost. Another way to cut the application cost is to have convenient refilling stations. Our experience is that it is desirable to have refill stations within one-eighth mile of each block. They should not be over one-fourth mile at the most. We have spray platforms about 12x12 at the height of the sprayer fender. On one corner of the platform we put a building about 6x6 for storing spray material. Having this building at the same height as the platform is handy for putting materials in and getting them out. With convenient refill stations, we let our refill truck stand idle.

Cutting Pruning Costs

One-half of the labor to picking time has been for pruning and brush removal. During the past two years we have used pneumatic pruners and the Clark platform. Our experience is that this cuts pruning time from one-third to one-half. On 20 year old McIntosh trees a three man crew does about 60 trees in eight hours, or on a per tree basis that would be equal to one man for 25 minutes.

A pruning platform is the one piece of new equipment that is not expensive, and it is useful whether one trims by hand or with pneumatic pruners. One does a better job with a platform, because he trims from the outside where he can see better; he thins out the outside of the tree where the tree needs trimming, and does not skin out the center.

Until we had pneumatic pruners and a platform, we were always behind in our pruning even with a four man crew. With three men we had our pruning in good shape last spring, and pruned an eight acre block for a neighbor.

Removing Brush

The big job in brush removal is to get the brush out from under the trees. We rebuilt a dump rake and used it to remove all our brush except Greenings the past year. We put a small wheel with a 6:00x16 tire on the right. Then we moved the tongue and dumping mechanism near the left wheel. We put lifters on the front to raise the limbs, and the rake goes under the limbs of the trees with practically no limb breakage.

Sowing fertilizer by hand around the trees is a good way to give the boys exercise and keep them busy. The past year we

applied the nitrate to all of our bearing orchards with a fertilizer attachment on a tractor. We put a tube down so that the fertilizer was put in a band. On apples we sowed up one side of the row and down the other; then we drove at right angles—up one side the row and down the other. On bearing peaches, pears and cherries we went only once through each space; that is, we sowed once north and south and once east and west.

This method is much easier and faster than by hand. The only difference is that the fertilizer is in a square instead of a circle.

We sow mouse bait with a seeder hitched behind a tractor. We extend the drawbar of the tractor so that the seeder runs out beyond the tractor wheel. Our 9 year old boy did part of the bait sowing last fall.

Today we must obtain high yields of fruit of large size and good quality; at the same time we must keep costs as low as possible.

Spray Materials

One way to increase yields is to use those spray materials that have the least harmful effect on yield. For over a decade we have not used any lime sulfur after the delayed dormant, and very little sulfur after the first cover spray.

The use of DDT has eliminated lead arsenate in all sprays except the calyx and 10 day. In these two applications Parathion will eliminate the lead arsenate on all varieties except McIntosh and its relatives, and it may eliminate it on those varieties.

Size of Apples

To get good size of apples we have thinned with hormone sprays for two years with excellent results. Both years we applied it on all our Baldwins; both years we thought we had thinned them too much, but when harvest came we had plenty of good sized apples. We have also used hormones for two years on Cortlands, and one year on Rhode Island Greenings, Macouns and some McIntosh. The only place we have over thinned is on some Cortlands; on the other hand, where we had excellent pollination for Cortlands, and where many apples had been two to two and a half inches in the past, we have gotten a good crop of good sized apples with the hormone spray.

Sticker Sprays

After we have gone to the expense of getting a crop of apples near picking time, we think it is good insurance to apply a sticker. It will also lessen the drop during the picking operation. We used a sticker on all our McIntosh, Macouns, Twenty ounce, Kings, and Baldwins this past fall, and we wished we had used it on Rhode Island Greenings. One has

only to save one-third bushel to a tree to pay for the sticker and the cost of applying it.

During the past 10 years more new practices and new equipment for the growing of apples have been introduced than in all previous history. We must each analyze our own business to see how we can take advantage of as many as possible of the new things that science and experience has given us.

New Simplified Calf Starter Costs Only $3.75— A new, low cost simplified calf starter that can be easily mixed on the farm has produced growth gains well above average for about half the cost of raising calves with large amounts of whole milk.

K. E. Gardner, University of Illinois dairyman, says the starter costs only $3.75 per hundredweight, including grinding. "It's the lowest cost calf starter I know of," he says.

Here is the formula: 50 pounds of shelled yellow corn, 20 pounds of oats, 27½ pounds of soybean oil meal (either expeller or solvent), 1½ pounds of steamed bonemeal and 1 pound of salt. It provides 18 per cent total protein and should be coarsely ground.

At the college of agriculture, this starter was tested on 53 dairy heifers of all five breeds. Their growth gains averaged from 108 to 134 per cent of normal. These gains compared closely with those of 23 control calves getting a more expensive, complicated starter.

Calves first received the simplified starter at two weeks of age and were carried on it to four months of age. They ate it free-choice, up to 4½ pounds daily, with all the good quality legume or legume-grass hay they wanted, plus water and salt. Good results in raising calves depend heavily on feeding good quality hay.

The calves averaged only 380 pounds of whole milk fed during an 8 or 10 week period. This is less than half the whole milk often fed, for a saving of about $20 per calf in cost of whole milk fed.

Holstein, Ayrshire and Brown Swiss test calves each averaged 367 or 369 pounds of whole milk during eight weeks, while Jerseys and Guernseys averaged 379 and 414 pounds, respectively, during 10 weeks.

Vitamin A and D supplements were fed in the test. But you get just as good results by feeding good rations without these supplements, according to recent Illinois tests. If you're forced to feed poor quality hay, you might feed a dry powder vitamin A and D mixture or cod liver oil to be sure of providing enough of these vitamins.

Illinois Extension Service

He Built $600 Into Two Thousand Acres

Gordon Beach and Roger Whittaker

Condensed From The Western Farm Life

TWELVE years ago, Lowell Allen of Wellington, Colorado, looked at the ranch he had just bought — a weather-beaten house and garage, a tumbledown barn, and 320 acres of fenceless, waterless, windswept desolation. Now, as he stands at the highest point of the ranch, he sees two garages, three granaries, two sets of corrals, a modern house and barn, two neat tenant houses, and acres of flowing grass cover. Fat, glossy Aberdeen-Angus cattle graze in green pastures. Classes in range management come periodically from near-by Colorado A & M college to study Lowell Allen's ranch and his methods.

In 1937 Allen was practically broke—like many good men at that time. He had been a salesman and buyer for the Colorado Milling & Elevator Co., had done construction work for six years, and had been squeezed out of sheep feeding by the price drop in the thirties.

$600 Buys a Start

He had salvaged just enough to make a $600 down payment on a rundown half section of land five miles north of Wellington. Allen didn't quite know what he was going to do with it. All he knew was that if he was going to get anywhere, it was time to get started. He had always dreamed of a place of his own, and he liked the idea of being his own boss.

"The depression was what really sold me the land," Lowell Allen says. "Like everyone else, I was scared. Land meant security and safety, something to tie to and depend on."

But he had only 320 acres of rundown range, hardly enough to fool with. What could a man do with that?

Allen worked the land on week ends, picked up a few cattle now and then, and put $50 a month into the place from his salary. When the ranch started to pay for itself, he bought another half section, adding land this way until he had 2,014 acres.

"Water was my big problem," Allen says. "In 1940 I was taking flying lessons with a friend of mine. I spent most of the time over the country around my ranch."

Reprinted by permission from The Western Farm Life, Denver, Colorado, June 1, 1952

He got an idea from the lay of the ridges and valleys that there might be a streak of water underneath. He'd heard a lot about irrigating pastures from the soil conservation service and wanted to try it, but his acres were high and dry where he couldn't get ditch water. If only there was an underground flow . . . Allen pictured his orphan range transformed into a plush livestock factory.

He had plenty to gain and nothing to lose, so he and a friend, Charles Fitzsimmons, then president of a Fort Collins bank, "witched" for a well. Charlie offered to use his willow and Allen had a good idea where the water was. The willow dipped sharply in several places and Allen drilled test holes and hit water.

But he still didn't know if there was enough for irrigation. The only way to find out was to put down a well, so Allen tightened his belt and went to work. The well produces 2,200 gallons a minute. But the water was too low to reach his pastures. As Allen looked at the well and his high point 500 feet away, he reasoned that a dike could direct the water there and then it would go wherever he wanted it. So he built a dike.

Expanding Irrigation

Allen's big plan is to convert 710 acres to irrigated pasture and hayland. He's been working at it since his well came in, adding 50 to 80 irrigated acres a year. He levels the land by cropping it, planting wheat or corn to hold the land together, leveling again and planting alfalfa. When the land is right, he sows intermediate wheatgrass and brome.

When Allen isn't planting, mending fence or tending to other chores, he keeps busy improving his irrigation system. He has put siphons under his roads, using steel culverts and concrete ends, with wrought iron weed traps made at his own forge, that almost clean themselves. He even built a siphon under the North Poudre irrigation ditch to carry his water to his lower place.

"When I finish the job," he says, "I will be able to turn my pumps on and irrigate all my pastures without losing a drop. At the end of the line I'll have a tank to catch the run-off and put the water through a sprinkling system, thus adding 50 additional acres of irrigated land." His program is going to take time, he admits, but he's getting good crops while he prepares the land for a border irrigation system.

Registered Angus Herd

Allen has been adding to his Angus herd all along. He now has 200 head of registered cattle.

"I like Angus," he says, "because they don't burn, and because they're polled. Dehorning is a lot of work, and has to be done

when other things are pressing. I've been told that Angus are mean and hard to handle. Maybe so, but I can lead mine around the whole place with a bucket of feed."

On non-irrigated land, he rotates his cattle, using the land for winter pasture one year, and summer pasture the next.

Wheat Cash Crop

Lowell Allen uses around 600 acres of his non-irrigated land for wheat. This land is on top of a row of low hills that make up the eastern part of the ranch. The wind swept over the wheat and for years blew away the top soil and then the grain. Allen stopped this wind robbery by chiseling 12 to 15 inches deep, bringing up clods of clay that hold the fine top soil down. He puts 300 acres in wheat every year, turning the stubble on the other 300 under to form a mulch.

What strikes you on a visit to the Allen ranch is the orderly neatness of everything. No slipshod workmanship or junk piles are to be found. The wells and siphons are clearly marked with the date of construction. The pumps, except for the big well, are set below freezing level in neat covered stalls. Barns and houses show fresh paint, crops and cattle show profit.

Beef Cow Herds Can Be Profitable

Don't let someone scare you into selling a good commercial cow herd with the argument that cattle will get cheaper because numbers are increasing. Harry G. Russell, Illinois extension livestockman, says that over a period of years good, well managed cow herds have been a profitable investment. That is particularly true on farms that are adapted to commercial cow herds and that have an abundance of high quality permanent pasture and roughage.

Russell emphasizes the importance of good individuals. It costs no more to keep a good cow than a plain one. However, he gives a few rules for management that are important:

1. Maintain cows during the winter on low cost roughage rations.
2. Use a good, growthy bull, and limit the breeding season.
3. Breed for early calving, not later than April in Illinois.
4. Cull the cows that do not breed regularly or that fail to calve. Keep a production record.
5. Plan your program to hold labor and overhead costs, including shelter, to a minimum.
6. Wean calves in October or November.

— Illinois Extension Service

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Our Sacred Cows?

Dr. P. H. Tracy
Department of Food Technology
University of Illinois

Condensed From Hoard's Dairyman

WHEN we speak of "sacred cows," we refer to those practices or beliefs that have come to carry a "Thou shalt not touch" sign in dairying. Most of our sacred cows were deified or made holy by an infant industry struggling to build a continuing market for milk and cream.

Many of these practices or beliefs contributed greatly to the early stability of dairying. They served a good purpose. Years have passed and times have changed, however. We do not believe that these sacred cows should remain untouchable in a rapidly changing world. We must change with it to meet the demands of the consumer, providing the products she wants at a price she is willing to pay.

The first sacred cow to be examined will be that practice which classifies our milk into grades, depending on how it is used.

Not long ago an article, entitled "Milk Costs Too Much," appeared in one of the national consumer magazines. That article is but one indication that our customers are concerned about the cost of milk but do not understand why it must sell at the price it does.

It is true that there are many items entering into the cost of the glass of milk served you in restaurant for, we will say, 10 cents; a per quart cost of 40 cents. Often overlooked are those costs caused by the many regulations placed upon dairy farmers and dairy processors. Laws regulating the production and distribution of milk vary, being more severe in some markets than in others.

Overlapping regulations are common, particularly in sections where milk is shipped to more than one market; each with its own standards as to how the milk should be cared for by the farmer, the equipment he should have in his milk house, and just how his barn should be constructed. It is obvious, even to regulatory officials, that these regulations should be simplified and unified. Certainly dairy farmers can express themselves on this point.

All Milk Should Be "Fit to Drink"

Our economists contend that milk should be classified into

Continued on page 54

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Fort Atkinson, Wisconsin, November 10, 1951

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What Sacred Cows?

Norris T. Pritchard

Condensed From Hoard's Dairyman

IN HIS interesting article "Is it Time to Sacrifice Some of Our Sacred Cows?" (Hoard's Dairyman, November 10, 1951), Dr. P. H. Tracy draws several startling conclusions on issues vitally important to American dairymen.

He obviously does not approve of (1) pricing milk according to its final use, (2) marketing more than one quality of milk, and (3) pricing skimmilk low relative to butterfat.

He accuses dairymen of being unrealistic and unprogressive because they follow these practices which he dubs "sacred cows."

In spite of my high regard for Dr. Tracy's competence as a dairy technologist, I disagree fundamentally with him on these three important economic issues. Instead of being "sacred cows," the marketing practices he so vigorously condemns are economically sound. They exist because of some highly practical and common sense reasons.

These Are Not Free Markets

Let us first consider pricing of milk according to its final use in city milk markets. Milk prices in these markets are negotiated prices. They are not free, open-market prices. City milk markets are not freely competitive markets because they fail to meet some essential requirements of such markets.

Free markets require, among things, the existence of many buyers and sellers. No buyer and no seller may be so large in relation to the whole market that, acting alone, he can effect market supplies or prices to any measurable extent. These conditions are approximated in our great national markets for grain and many other agricultural commodities. They are not met in city milk markets.

Usually there are hundreds or thousands of dairy farmers supplying a city. On the other hand, these are only a few large-scale milk distributors. Frequently, two or three companies distribute 50 to 75 per cent of all milk sold in a city. Concentration of milk distribution in the hands of a few firms is the direct result of great economies of large-scale operations in milk distribution. The small number of distributors, plus

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Fort Atkinson, Wisconsin, February 10, 1952

the fact that milk is so bulky and perishable that producers usually must sell it in a near-by city, puts the buying and selling of milk by distributors in the category of a limited monopoly.

The few large milk distributors in a city have the same kind and degree of control over their sales and prices within the city as have such huge corporations as U. S. Steel and General Motors in the country as a whole. The "ducks" are quite similar even though the sizes of the "puddles" are very different.

Charging What Traffic Will Bear

Companies enjoying such favorable business posltions usually are able to charge about as much as the traffic will bear. In the milk business, this means a high price for milk sold in bottles relative to prices of manufactured dairy products.

Dairy farmers unable to destroy the monopolistic powers of milk distributors have organized bargaining co-operatives with the objective of capturing from distributors some of the benefits of their favorable position. Today, in all of our large cities, milk prices are fixed by negotiation between organized producers and organized dealers. (In federal order markets, this negotiation is a formal, public procedure in which consumers and representatives of the United States government are also parties.

Early in the history of negotiations with distributors, milk producers found they could force dealers to pay higher fluid milk prices for only that portion of the milk sold in fluid form. Any surplus of milk received from producers, if not wasted, had to be used for manufactured dairy products and priced lower. In this way, classified pricing was developed.

Priced on Use Not Quality

Class I includes milk (and sometimes cream sold in bottles. Class II (or some other designation of this class includes milk used for manufactured dairy products. These classes are use classes; they are not quality grades of milk.

Some confusion on this point exists because of the common practice of including within class I all products which city health departments require to be made from grade A milk. Milk used for class I products is paid for at the class I price, but all surplus grade A milk used for class II products is priced to dealers at the lower class II price. The price actually received by milk producers is a blend of these class prices.

In many markets, differences between classes I and II prices are large. These differentials consist, in part, of a premium for high quality milk and they are, in part, the result of the bargaining power of a producers' co-op-

erative.

Classified pricing under existing organizations of city milk markets is economically sound. Furthermore, returning to a system of flat prices, such as we had 40 and more years ago, is impossible. This would require breaking up existing milk distributing companies into many smaller firms. It would deny us important savings in costs resulting from large-scale operations. Instead of three or four milk delivery trucks on every city street, we might easily have 20 or more.

Duplications of plants and delivery services could easily raise marketing costs and milk prices several cents per quart and price milk out of much of its present market. Like it or not, classified pricing will remain because it is in accord with basic conditions of marketing milk in cities.

Single Quality of Milk

Dr. Tracy's second proposal is a single quality of milk on the market. This proposal is contrary to both fundamental laws of agricultural production and of economics. Imagine, if you can, the production of a single quality of milk on some two million commercial dairy farms in all parts of the United States.

Variations in product quality are the rule and not the exception in all kinds of productive enterprise, especially in agriculture. Uniform quality, implied by the proposal for a single quality of milk, is costly to achieve. It is doubtful that a single, uniform quality of milk is either physically possible or economically desirable.

A basic principle of economics is that human beings differ greatly in tastes and desires. They differ at least as much in their ability to satisfy their wants. Some are poor; a few are wealthy, and the majority have incomes somewhere between these extremes.

T-Bones and Hamburgers

Most of us prefer choice T-bone steaks, but our limited incomes force us to be content with hamburger made from third or fourth grade beef much of the time.

Markets for most products rarely are adequately served by only one grade of product. Several grades are essential to meet the varying tastes and purses of consumers.

It is generally conceded that the quality of cream used in manufacturing butter greatly affects the quality of butter. It is also well known that some people prefer 93-score butter to butter of other grades; other consumers prefer, say, 90-score butter. What would happen to butter sales if people who have strong preferences for 90-score butter could not purchase it because the butter industry manufactured only 93-score butter?

Or, alternately, would it make

sense to require farmers to produce only one high quality of cream and then to store it in creameries long enough to acquire the flavor characteristics suitable for a 90-score butter in order to retain this portion of the butter market? Answers to these questions are obvious.

Also, if evaporated milk high enough in quality to be recommended by the medical profession for the feeding of infants can be made from relatively low quality raw milk, it is neither good economics nor good business to use milk of much higher quality which is much more costly to produce.

Consumers Must Be Willing to Pay

All milk must certainly be fit for human consumption, but there are varying levels of quality above such a minimum. Dairy technologists have frequently indicated that different qualities of raw milk can be used for different products. Markets exist for these products and for the several grades of each product. A single quality of raw milk might cause dairymen to lose some of these markets because it would not meet the demands of consumers.

Increasing the quality of milk and of manufactured dairy products is a commendable goal, but it is good business and economically sensible only up to the point that consumers are willing to pay the higher costs of obtaining higher quality products. The dairy industry cannot afford to allow the desire for high quality to become such an obsession as to get the important facts of economics and sound business practices.

The third major proposal made by Dr. Tracy is to abolish the practice of paying for milk on the basis of its fat content alone. He also states that nonfat milk solids should be priced higher relative to butterfat than they currently are.

There is a definite trend within the dairy industry to give increasing weight to nonfat milk solids in pricing milk. Many large city milk markets use a butter-powder formula in establishing milk prices. At present, about 20 per cent of this formula price is derived from the value of nonfat dry milk solids and about 80 per cent is derived from the price of butter.

Plants producing both butter and powder obviously determine prices they can pay producers for milk on the basis of their sales of both butter and powder. There remain, however, many manufacturing milk (or cream) markets, especially west of the Mississippi river, where skimmilk has no value except for animal feeding. The reason is that these creameries simply have no outlets for skimmilk regardless of how they might process it. In these mar-

kets, butterfat is the only portion of milk for which plants can afford to pay farmers.

Prices of nonfat milk solids are rising slowly relative to butterfat prices. The reason is that human uses of nonfat milk solids are increasing slowly. The facts are, however, that Americans generally value skimmilk so low that about 30 per cent of the nonfat solids produced in milk in this country is fed to animals or wasted. In contrast, more than 97 per cent of all butterfat is used in human foods.

Furthermore, at the present time the United States government finds it necessary to buy and store large quantities of nonfat dry milk solids in order to support even their currently low prices. On the other hand, in spite of comparatively high butter prices, all butter that the industry currently is producing is being sold in commercial channels.

As the demand for nonfat milk solids continues to rise, we can feel reasonably certain that it will be reflected in prices farmers receive for butterfat, nonfat milk solids and whole milk. It is even possible, some time in the distant future, that nonfat milk solids will have more value than butterfat. Such a development would have far-reaching consequences for dairymen.

In the meantime, the only practical guide for dairy farmers and dairy plant managers are the prices fixed by the marketing system for dairy products. As yet, this mechanism, the best means we have of determining the relative values of products and of guiding production and consumption, puts a low value on nonfat milk solids relative to butterfat.

No farmer and no dairy plant operator, no matter how firmly he believes that the value of skimmilk ought to be higher than it now is, can afford to act contrary to the dictates of prevailing market prices.

What we can do, perhaps, to strengthen the trend toward rising values of nonfat solids is to persuade more Americans that out nutrition experts are correct in their high appraisal of the nutritional values of skimmilk and dairy products made from skimmilk and whole milk.

Left Hams vs. Right Hams — A New York cafe offered "left" ham sandwiches for $1.50, but charged 55c for those made from "right" hams. Packers were quick to point out there's nothing to the idea that hogs scratch with their right legs and thus the right hams are musclebound and tough to eat. Hogs scratch with both legs, say the packers — but mostly just lean against a post and rub.

OUR SACRED COWS

Continued from page 48

grades on the basis of its use. Milk sold in the bottle is supposed to be of higher quality and, therefore, the dairy farmer receives a higher price for it than that paid for milk used for either cheese or evaporated milk.

We assure consumers that all dairy products are safe and of high quality and yet we do not consider cheese or condensery milk suitable for bottling. Just how are we to explain this discrepancy to the public without their losing confidence in either our advertising or the value of manufactured dairy products?

A single grade of milk would help to do away with many of the present problems of overlapping control and consumer, as well as producer, confusion.

Milk either is or is not fit for human consumption.

If it is good enough to be made into ice cream, it is good enough to be sold in bottles for table use. The practice of grading milk may have been useful during the early evolution of the industry, but time is running out on such a practice. The production and handling of milk as an industry has become of age. It is time we consider the slaughtering of one of our "sacred cows" by establishing a single standard of quality.

Another of our "sacred cows" is the practice we have established of paying for milk on the basis of the fat content alone. This practice had its beginning in the creamery industry years ago when milk fat was the main concern of the buttermaker. The perfection of a rapid accurate test for fat in milk and cream by Dr. S. M. Babcock 60 years ago further emphasized fat as a yardstick for measuring the value of a milk product. Today, however, butterfat is being considered as a relatively less important part of milk as the other solids gain in importance from a nutritional view.

Is Fat the Only Measure of Value?

Our nutritionists justify our drinking milk on the basis of the importance of the skimmilk in supplying the protein, minerals and vitamins which are considered essential for growth and health. Formerly we were concerned with proper nutrition primarily for our children. But now we adults have become diet conscious as a result of popular writings. People live longer and they know that longevity is most likely if they eat properly.

As the fad for proper diets becomes routine practice for our people, the nonfat solids in milk will grow in importance. Yet we continue to measure the value of milk in terms of fat by buying milk from the farm on the fat basis and attaching to the fat most of the resale value of the

dairy product in which it is sold.

As a result of this major emphasis upon fat, the market price for the nonfat solids is but slightly more than the value of skimmilk for animal feeding plus the cost of processing. It would be difficult to convince the condensed milk and dried milk industries that they should pay more for the nonfat solids of milk so that the fat could be sold for less, yet that is exactly what needs to be done to properly evaluate these two types of milk solids. Nutritionists would say our present ratio of fat and milk-solids-not-fat prices of approximately five to one should be adjusted so that a higher evaluation is placed on the milk solids-not-fat.

Until this is done consumers will continue to pay a relatively high price for butter and a relatively low price for the skimmilk solids. From an industry point of view this is an important problem because of the shrinking per capita consumption of butter, due largely to the relative price of butter and margarine.

With the exception of cheese, ice cream and evaporated milk, the average consumer is eating about as much dairy foods as he did 40 years ago. Our industry has grown, of course, but largely as a result of an increase in population and the maintenance of a relatively high standard of living in our country.

The question might logically be raised as to how we can stimulate our people to use more milk and milk products. There is only one answer and that is by making it possible for the consumer to buy at a lower price without sacrificing quality.

The market for fresh dairy products today is different than it was even 20 years ago. Milk, cream, butter and ice cream are distributed over much wider territories than they were formerly. These products are perishable in nature yet to meet present market demands must be of good quality one week or longer after processing is completed. It may become necessary to modify our present methods in order to make practicable the longer time interval now existing between production and consumption of milk and milk products. Special processing techniques may need to be employed to make milk or cream less perishable.

Thou Shalt Not Add or Alter

One of the holiest of our "sacred cows" is the tradition that we shall not add to or alter the composition of milk in any manner. There are markets where the fat content of fluid milk cannot be legally standardized except by blending the milk from high testing herds with that of milk from low testing herds. Antioxidants cannot be used legally to prevent oxidized flavors from developing

in dairy products—a troublesome defect which occurs not only in market milk but also in frozen cream, butter and dried whole milk. The addition of a harmless antioxidant would aid in extending the life of these products. Incidentally, the use of antioxidants is permissible in some foods, such as lard and potato chips.

Milk solids can be used to build up the solids content of ice cream but not of milk or cream sold by that name. A product containing 12 per cent fat cannot be sold as cream; yet, in the Chicago market, for example, experience has shown that most consumers prefer such a product to a legalized cream containing 18 per cent fat that must sell at a higher price.

If the law were more liberal in encouraging new types of dairy products there would probably be an increase in the consumption of both fat and milk solids-not-fat.

The low-fat frozen products introduced to the consumer in recent years are meeting with popular approval. A product containing five to six per cent fat, 12 to 14 per cent milk solids-not-fat with 12 to 15 per cent sugar has much in its favor whether it be served soft or hard. The lower fat and higher milk solids-not-fat content of this product has nutritional advantages, is more refreshing than most ice cream containing a higher butterfat percentage, especially when served soft, and of course can be served the consumer at a lower cost. Yet our existing laws do not permit such a product being sold as ice cream, and in some states it cannot be sold at all since it does not comply with the existing state ice cream standards.

The per capita consumption of butter is approximately 60 per cent of what it was 20 years ago. The acceptance of cheaper spreads (peanut butter, salad dressings and oleomargarine) is of course largely responsible for this decrease in butter consumption. Experience has shown that such products cannot be successfully legislated against in order to protect dairy interests.

Blending the cheaper vegetable solids with butter has been practiced by the thrifty housewife for years, yet to commercialize on such a product would be considered highly sacrilegious by the dairy industry and illegal by regulatory officials. Yet who can deny that legalization of a spread containing a blend of high quality vegetable and butterfats which could be sold for 40 to 50 cents per pound would do much to recover some of our lost butter sales?

The dairy farmer is faced with substitute problems other than oleo. There never was a time when there was as much competition for the human stomach. As high material and labor costs and

high taxes force the price of dairy products higher, more and more consumers with fixed incomes will turn to cheaper or substitute products.

We Help Our Competitors

Filled milk, a product containing six per cent vegetable fat and 20 per cent milk solids-not-fat, is sold with considerable success in several states. Many consumers consider it a satisfactory substitute for evaporated milk. They are no doubt influenced in their thinking by the savings gained by its use.

By making available non-fat milk solids at a low price through our overemphasizing the value of milk fat, we in the dairy industry are playing right into the hands of our competitors who combine these nutritious and tasty solids with cheaper fats to make substitute dairy products.

The writer recently sat in on a discussion held by the management of a company which for a number of years has processed a topping for ice cream and other desserts made from 30 per cent cream. Their annual use of butterfat has been exceeding two million pounds. Because of competition from toppings made from vegetable solids which can be sold at a lower price, this company is being forced to consider the substitution of the cheaper vegetable solids for both the milk fat and milk solids-not-fat.

To obtain the national picture, multiply this one incident by "x value" and the situation becomes serious. Would it not be well to promote research at our universities to study the merits of products made from combinations of vegetable and milk solids in order to retain as much of this market as possible even though another of our sacred cows would need to be slaughtered?

We Must Move With Caution

It is important that we proceed with caution in formulating our policy against ersatz milk, whipped cream, ice cream spreads and other imitation dairy products. Bringing pressure through lobby groups to make such practices illegal can only mean more trouble for our industry in the end and will cost us the confidence and good will of the consuming public. On the other hand, if combinations of milk solids and vegetable solids could be developed and legalized which would meet with consumer acceptance and which could be sold at prices lower than those charged for regular dairy products, the total consumption of milk solids might be increased.

City, state and federal standards for dairy products are necessary and desirable in order to prevent fraud. However, if, by changing some of these standards, we could better maintain a market for milk solids and at the

same time supply the consumer with palatable and nutritious products which could be sold at lower prices, it would be well for us to give consideration to making such changes even if it does mean the sacrificing of one or more of our sacred cows in the dairy industry.

How to Keep Ladino Coming — How do you keep the grass from crowding out the ladino clover in your ladino-grass mixtures? It's a real problem. Here are a couple of suggestions:

Let the growth get 8 to 10 inches tall before you graze or mow.

Set the mower so that it cuts only two inches above the ground when you clip the mixture after it has been grazed. (In the year of seeding, the *last* mowing should be early enough to permit four to six inches of growth before winter.)

That is what Agronomist B. A. Brown at the Connecticut Experiment Station recommends after comparing 10 different cutting systems for 11 years. Brown doesn't know for sure why close mowing favors ladino. But here's what he thinks happens:

Grass leaves start growing again from the point where they're cut off. Ladino leaves, however, start from stems which lie along, or just below, the surface of the ground. Also, grasses store food in their stems. Close mowing removes more of these reserves—slows the plants down.

In these experiments, the fields with the most clover were those where they mowed ladino-orchard grass and ladino-timothy two inches above the ground when the growth was 10 inches high. Next best was when growth was eight inches high. Leaving a four inch stubble cut the yield by 10 per cent, *and the forage contained only one-third as much ladino.*

Smallest yields and the least amount of ladino came from fields where eight inch growth was mowed four inches above the ground, with no grazing or clipping after September 1. The lack of fall grazing gave the grass a chance to get the upper hand. (Grasses grow much faster than ladino in cool weather.)

There are other things that will cause ladino to go out of your mixtures. Cattle like it—will over-graze it if you give them the chance. Then, too, ladino needs large amounts of phosphorus and potash—especially potash. Regular top-dressings with these two plant foods will add years of life to ladino stands. *Farm Journal*

Topdressing Meadows and Pastures

Grass Roots on Surface of Soil Respond Quickly to Fertilizer

D. R. Dodd

Extension Agronomist, Ohio State University

Condensed From Ohio Farm and Home Research

THE top dressing of meadows and pastures with nitrogen, phosphoric acid and potash has been recommended for some years in Ohio. The proportionate amount of each element used has depended upon the amount of grass and legumes in the sod to be fertilized and how much and how recently phosphate and potash had been applied.

Nitrogen applied to a grass sod almost invariably gives quick response in much more rapid rate of growth and greater total yield.

Where potash has been used on high legume content sods, it usually has made a good showing.

In the case of phosphate applications on either grass or legume sods the response, although usually very pronounced in the end, has frequently been slow in showing.

It is known that the potash and nitrogen are water soluble and go into the soil with the first showers. It is also known that the phosphate is likely to be "fixed" where it falls with little opportunity to get into the soil with the penetration of moisture.

Some farmers have reported quick and excellent response to surface applications of phosphate on permanent pasture sods. Others have reported that two or three years were necessary to get much improvement. The same type of observations have been reported by experiment stations and farmers in other states.

These observations led to a study to see just where grass roots were growing in different types of sods, and to what degree the location of root development might offer a possible explanation for the different types of response.

In the case of poor sods on badly depleted lands and on closely grazed, thin sods in midsummer where bare ground was exposed, few roots were observed at the immediate surface of the soil. However, when examinations were made on good sods and especially during spring and fall and during moist periods of other times of the year, it was observed

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that all of our common grasses were developing a considerable root content immediately on the surface of the soil. In fact, at certain times, some of the grasses developed such a heavy root mass on the surface of the ground that after the tops of the plants were removed it was still impossible to see the soil except where castings had been brought up by earth worms and other insects and piled on top of this mass of surface roots. This heavy surface root development was more pronounced in the case of dense sods providing a surface mulch, notably perennial rye grass, Kentucky bluegrass and meadow foxtail as contrasted with timothy and bromegrass.

Organisms Helpful

In connection with this study it was observed that, not only did the grasses, and the legumes to a less degree, develop roots on the surface of the soil, but that soil organisms were rapidly covering these surface roots with castings brought up from below. In some instances, it appeared that a sixteenth or even an eighth of an inch of such castings might be brought to the surface annually. (Persons interested in this can make a quick check on their own lawns.)

These observations seemed to offer a logical explanation of why some farmers are getting quick response to phosphate fertilizers applied on the surface of the soil and others are waiting for two or three years for a noticeable response. Obviously phosphate fertilizer applied at a time of the year when the ground is likely to be dry on the surface, or on a thin sod where much of the soil is exposed, might be expected to give little response until more favorable conditions developed for surface root growth. However, if the phosphate were applied in the late summer, early fall, winter or early spring or during a moist season then a rather quick response might be expected. The more dense the sod mulch in the beginning, the more quickly response might be expected.

In the case of a number of different kinds of grasses, all above ground parts, except roots, were clipped off and the surface then photographed. These included perennial ryegrass, barley, Kentucky bluegrass, orchard grass, bromegrass, tall fescus, timothy, meadow foxtail and ladino clover. Even with photographs it is difficult to rank these plants in exact order in their surface root development. Ladino clover did not rank high compared with some of the grass; but in all cases there appeared ample roots to utilize surface fertilizer applications. The grasses might be ranked in order of increasing surface root development about as follows—brome-

grass, orchard grass, timothy, tall fescue, Kentucky bluegrass, ryegrass and meadow foxtail.

These observations emphasize the soundness of the recommended practice of top dressing meadows and pastures. Where conditions are favorable and suitable equipment is at hand, there may be some advantage in the incorporation of phosphate top dressings in the soil, but certainly lack of suitable equipment for doing so is no justification for omitting the top dressing practice. Numerous trials have resulted in profitable yield increases and this root study offers logical explanation of why such response should be expected.

What Kind of Fertilizer

The kind of fertilizer to use as a top dressing on meadows and pastures depends on the time of applications, the use to be made of the increased growth, the amount and kind of recent fertilizer applications, and the kinds of plants growing or desired in the meadow or pasture area.

In the case of grass sods that have had adequate applications of phosphate and potash, recently, there seems to be little advantage in anything else than a fall or spring application of a straight nitrogen carrier supplying 40 to 80 pounds of nitrogen per acre, depending upon the amount of additional growth desired. Where recent mineral applications have not been adequate, and additional

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growth or early growth of the grass sod is desired, the application might logically be a 12-6-6 or a 10-10-10 fertilizer at a rate which would provide 40 or more pounds of nitrogen per acre.

Where a gradual improvement of the permanent sod is needed, the application might consist of 700 pounds of a 20 per cent su-per-phosphate or its equivalent applied at any convenient time. As the pasture improves, 0-20-10 or phosphate with manure are likely to prove more profitable.

In the event of a high legume content sod such as an alfalfa-ladino mixture, or alfalfa alone, the application might more fittingly be three or four hundred pounds of an 0-10-20 every year.

The reasons for the more frequent application of the potash as contrasted with the phosphate are in the fact that the potash goes into the soil at once and is either utilized by plants or removed by leaching within the first one or two years. If more potash is applied than the plants need they are likely to take it up in luxury consumption, thus providing the crop with more potash than it needs one year and leaving it with an inadequate supply the second and third years.

In conclusion we point out that the much more liberal fertilization of meadows and pastures is a highly profitable practice.

Ladino Can "Take It"

Lee N. Rosencrans

USDA Soil Conservationist

Condensed From The Michigan Farmer

ROBERT HUTTON, a Cass County, Michigan, farmer who has one of the oldest stands of Ladino clover in Michigan if not the entire midwest, is now conducting a field trial which has drawn the interest of many professional agronomists. By intensive pasturing, Hutton is out to learn how much abuse his nine year old stand of Ladino will take. So far, it has thrived on the treatment.

Hutton first read about the "wonder legume" in a farm magazine article published late in 1942. He seeded the Ladino at the rate of two pounds per acre in the spring of 1943 with a nurse crop of oats fertilized with 200 pounds per acre of 3-12-12 fertilizer. Soon after the oats were harvested, Hutton began pasturing the clover and has been pasturing it from 10 to 11 months a year ever since. Hutton believes his program of intensive grazing has actually improved the stand rather than weakened it.

"Two years ago," Hutton said, "we seeded 40 acres more to Ladino so I thought I would see just how much punishment this six acre stand would take. This is how we pastured the Ladino during 1950."

"We had 125 fall pigs on it from August, 1949, to August 8, 1950. In the spring of 1950 we turned in another 125 spring pigs — May to August 8, 1950. After the pigs were marketed on August 8th, we then turned in 199 ewes and 200 lambs—August 8th to September 18th. The lambs were marketed on September 18th and the 199 ewes were left on until late October."

"So you see," Hutton concluded, as we looked at the luxuriant stand of Ladino one sunny afternoon last July, "I still don't know how much abuse Ladino can take. I seem to have broken all the rules—late fall grazing, excessive grazing, no commercial fertilizer — and yet like Topsy — it just grows."

The Huttons are co-operating in the Cass County Soil Conservation District program and are following a good land use program that keeps 60 to 80 per cent of the land in meadow. Corn is raised in each field on an average of one year in seven. Every

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small grain crop is seeded either to clover or alfalfa and Ladino and this practice allows a better choice of fields to remain in meadow. It also provides good plow-down crops on fields to be put back to grain the following spring.

The Huttons are using winter barley as a substitute for the corn they do not raise. They believe it is nearly equal to corn in feeding value and keeps the soil from washing. Yields of 40 to 60 bushels per acre are about average for winter barley in this section of southwestern Michigan. Hutton's yields average above 60 bushels per acre.

In addition to the breeding flock, the Huttons purchase one or two carloads of feeder lambs each year and keep a large herd of feeder cattle.

When asked about bloating, Bob stated he has never had a serious case of bloat on Ladino clover. This may be due to the fact that the Ladino is always seeded in a mixture with alfalfa and bromegrass.

Farm Leases Should Cover New Costs

Owners and tenants now have new problems not covered in old type leases, according to J. H. Coolidge, Kansas farm management specialist. Liming, fertilizing, seeding legume and grass crops, and establishing and maintaining waterways, terraces and water ponds are some of the newer costs of farming.

Landlords and tenants now have various agreements for handling the newer costs. Representative methods cited call for the landlord and tenant to share the costs of fertilizer 50-50 with the tenant applying it. If the tenant pays cash rent, he usually pays all fertilizer costs. Landlords pay for legume seed with tenants doing the seeding. Landlords pay for constructing terraces and ponds and tenants maintain them.

When repairing old improvements, the landlord buys materials and the tenant provides the labor. If new improvements are being added, the landlord pays for both materials and labor.

Coolidge pointed out that written leases have several advantages: They make sure that problems are discussed and a mutual agreement reached; provide a basis for making minor changes; serve as a memorandum for both parties; provide for important farm practices; prevent common law interpretations not adapted to the farm; protect both farmers and their heirs in case of death; make terms of rental definite, and provide a reasonable period of notice to terminate the lease. —*Kansas Extension Service*

Ham Sandwich and the Common Cold

Henry La Cossitt

Condensed From The Nation's Business

GUSTAVUS FRANKLIN Swift was a Yankee from Cape Cod. He wore chin whiskers and was nicknamed Stave. One day Stave's father lent him $20 with which, for some reason, he bought a heifer. He slaughtered the heifer and hawked the meat up and down the Cape Cod byways. The byways led to highways which, in turn, led eventually to Chicago, where Stave founded the enterprise that flourishes today as the more than two billion dollar Swift & Company, largest of the giant packers.

Stave Swift had New England thrift. Even as early as the experience with the heifer he had observed something about the meat business. Because he did he once made a remark that, more than any other, characterizes the meat industry. Said old Stave Swift, "You don't *make* money in the cattle business—you *save* it."

Since the packers operate on probably the smallest margin of profit of any of the large industries—in sales value of products it is surpassed only by motors—it is vital that they save money. Rarely do they average a net of more than a fraction of a cent a pound on meat. And frequently they'll sell a pound of dressed beef for *less* than the price per pound for the animal on the hoof. They are able to accomplish this by saving and sale of by-products.

There are 40 classifications of by-products from beef, 27 from calves, 28 from sheep and 31 from hogs—all broken down into numerous subdivisions, and the numbers are growing.

Everybody knows about wool and leather, but look further. Maybe you own a painting by Grant Wood or Thomas Hart Benton or a copy of one of the older masters. If so, it was painted with a brush made up of the delicate hair that grows inside the ears of cattle.

The India ink used in drawing the plans of your house came from charred animal bones. When you hear Jascha Heifetz play his fiddle he is drawing his bow across strings made from the intestines of sheep and, until cheaper nylon displaced it, the gut of 11 lambs—not an unfor-

Reprinted by permission from the Nation's Business,
Washington 6, D. C., May, 1952

tunate cat, as you may have thought—provided the strings of the racquet with which you play tennis.

Betty Hutton and Shelley Winters remove their movie make-up with facial creams that have hog lard or lanolin, a fat obtained from the wool of sheep, as their base. The soap in your bath is a by-product of the packing business, as is the detergent your wife uses on her windows or in the kitchen. That bubble gum Junior pops has gelatin—from hoofs—and animal fat in it, as has the candy that sister's beau gave her as a birthday present. And the migraine headache you may get trying to keep the family going in these inflated times will be eased by chondroitin, which comes from cartilage rings taken from the windpipe of livestock.

If you drive the family to the country on a hot summer's afternoon you will roll on tires in which synthetic rubber is cooled by a new chemical derived from animal fat, thus lengthening their usefulness. If you are a farmer, the tractor you drive has an air filter in the cooling system in which hair from the tails of cows is a principal factor. If you are a businessman and your office is air conditioned, curled hog hair, of which Wilson & Company is the largest processor, doubtless is in the insulation.

The meat industry is spending more than 15 million dollars a year on research in its own laboratories and in grants and fellowships at universities, colleges and hospitals. It spends this amount to save money and to survive by saving money. Actually, only 54 per cent—an average—of a steer is used for beef; of the rest, 10 per cent is of no value at all, 20 per cent is lost through shrinkage and 16 per cent is usable in by-products. The packers must find new and better uses for by-products, because of constant competition from every side.

At the moment, for instance, synthetic rubber and plastics threaten the leather market because more and more of these products are going into shoes. Therefore new research at the American Meat Institute Foundation, on the University of Chicago campus, is directed toward more efficient and less costly methods of processing hides. This research is trying to rid the hides of extraneous materials that interfere with tanning and increase the freight costs by adding weight. Thus, if successful, the result will be a cheaper and better leather to combat synthetics and plastics which, in turn, will benefit the consumer in lowered costs and better shoes.

Again, there is research in new uses for tallow, threatened by synthetic detergents, and for meat scrap, now challenged as a live-

stock feed by APF, a mold discovered by drug concerns and sold as a substitute for scrap. Armour, for instance, is spending six times as much for research today as it did 10 years ago. The programs at the other companies are stepped up commensurately.

Research in the meat industry is of especial significance. In no other enterprise are the interest of the industry itself and that of the public so closely allied. The packers deal with life. So does their research. In this way insulin was discovered. From the pancreatic glands of meat animals it is processed and given to diabetics around the world, who are literally permitted to live because of its action in reducing their blood sugar content to normal.

Thus was discovered ACTH, the wonder hormone, in the anterior lobe of a hog's pituitary gland. Foremost in ACTH research have been the scientists at the Armour laboratories out in Packingtown in the Chicago stockyards. Armour's pharmaceutical branch is now making a product called Acthar Gel, which is ACTH in a repository preparation.

Since Acthar Gel, used in treating at least 16 diseases, is longer acting than the pure stuff, it reduces the dosage. Where a patient might have had to take daily doses, this regimen has been modified to weekly injections. Likewise, because of improved processing, Armour has recently cut the price of Acthar Gel 25 per cent.

Cortisone, another wonder hormone—derived from the adrenal glands of cattle—is, of course, well known for its dramatic results in treating rheumatoid arthritis, hitherto one of the most painful and crippling diseases. The meat industry has co-operated closely with the Mayo laboratories at Rochester, Minn., in an effort to synthesize cortisone inexpensively.

Then there is Tryptar. Not long ago Victor Conquest, general manager and director of chemical research and development at Armour, got to thinking about a funny little enzyme called trypsin. Trypsin is found in the pancreas. Ordinarily, enzymes are rambunctious behavers and have to be watched. They are organic catalysts and cause change in the body. Enzymes digest meat and protein, for instance, but sometimes they are very ugly characters indeed. Pepsin, for example, if sufficiently aroused, will digest anything handy, including the wall of the stomach — which is a protein — causing stomach ulcers thereby. Trypsin, Conquest and his researchers discovered, is kindly.

Research developed Tryptar. It is processed trypsin with added inhibitors that prevent any attack

on live tissue. The product is now on the market in the United States and abroad and is being used in Korea to treat wounds. It also has proved especially good in early rehabilitation of burns and is useful in cases of enforced amputation and in fighting gangrene.

Probably the most remarkable use of Tryptar, however, has been in lung cases. It is used in treating tuberculosis and other forms of empyema of the lungs. Empyema means, simply, the presence of pus or infection in any cavity. Attacked by Tryptar, the infectious fluid becomes clear and watery and may be easily aspirated by the patient, thus clearing the lung. Although Tryptar has no proved direct effect as a killer of bacteria or an arresting agent, it is a fact that empyema fluid generally becomes consistently negative after roughly 10 or 12 days of treatment.

What this may mean eventually in pulmonary therapy is, of course, not yet known, but the possibilities are enormous. That it will exert an effect on chest surgery—as it already has—may be taken for granted. It also has proved itself in emergency surgery by creating a clean, operative field that reduces any risk associated with operating in a contaminated area.

Along with insulin, ACTH, cortisone, and other wonders discovered by the meat industry's researchers, Tryptar has added new meaning to old Stave Swift's axiom. They not only save money in the cattle business now—they save lives.

Armour's scientists also have come up with a new line of canned goods that is welcome news to people with misbehaving hearts. The salt-free diet, the rice diet and others long have been standard in the lives of men and women with a heart ailment. The new canned meats Armour is now marketing add variety to such diets.

By a process of its own, Armour now cans meats of low sodium content for people who formerly were doomed to the so-called rice diet. In the process they have lost little, if any, of their flavor.

Research in one company's laboratories benefits the entire industry. Enterprise and ingenuity, of course, will be served in the case of Armour's canned meats and the company will derive the advantage of being first on the market; but analysis by others undoubtedly will reveal the secret. When this is done competition will benefit the consumer in increased supply.

There is much activity everywhere, incidentally, in the business of canned meats. Hormel, at Austin, Minn., pioneered in this field and continues to experiment and improve. And at Swift they

are excited about experiments that they think may revolutionize the industry.

These are in the electronic sterilization of canned meat. If successful, this research will permit the sterilization of any kind of canned meat without heat—thus avoiding unwanted cooking. The Swift researchers have been bombarding cans of meat with electrons, but haven't at this writing, been able to determine what causes the loss of certain of the natural flavors. They think, however, that within a few years they will be able to market fresh meat in cans. This will mean that a fine sirloin steak may be canned, shipped anywhere and remain indefinitely sterile and flavorful. No refrigeration will be required either. Naturally, it will be the same with any other type of meat. This, they say at Swift, will reduce the price of meat.

Another method of sterilizing —and cooking—canned meats is being researched at the American Meat Institute Foundation. This is called dielectric heating. When perfected, it actually will cause the meat to sterilize and cook itself.

It works like this: A can of meat is placed between positive and negative electric poles. Alternating current is run through the can at high frequency. The current seems to rouse the molecules in the meat into a frenzy. Although it all is according to the cold laws of physics, the molecules actually seem to be doing a kind of tortured dance, as they attempt to align themselves with the 30,000 frequencies a second current. Such turbulent goings-on creates an internal heat that cooks the meat evenly, sterilizes it at the same time, and leaves the nutrients and flavor intact.

When the method is perfected, you will likely be eating much better.

The Foundation is supported by the American Meat Institute and is housed in a building built recently on the University of Chicago campus. Research is under the direction of Dr. Henry R. Kraybill, internationally known chemist.

The institute is an organization of more than 500 packing companies, big and small. It addresses itself to industry-wide problems, keeps a wary eye on Washington for legislation that involves the meat industry and does general jobs for the packers. A nonprofit institution, it works in collaboration with the University of Chicago.

Foundation scientists also have done something about the ageless argument between people who like their steak rare and those who want it well done. It long has been the contention of the rare school that a well done piece of beef loses some of its nutri-

tional value.

Well, say the foundation wizards, if you're a well done partisan, think nothing of it. Well done beef loses none of its nutritional value. How it tastes, of course, is your own business.

This also applies to bacon, where the crisp school has been at odds with the no-so-cooked school. Here again, taste is a matter of opinion, but the foundation scientists have shown that there is no significant reduction in nutrition even if the bacon is broiled until it crumbles.

Dr. B. S. Schweigert of Eau Claire, Wisconsin, the young chief of the biochemistry and nutrition department at the foundation, is hard at work on testing the availability of nutrients in certain foods. Obviously, it makes little difference how much of a nutrient is present in a food if the human system lacks the means of extracting it. Thus millions of children were unnecessarily browbeaten some years ago by having masses of spinach crammed down their throats because of the iron the spinach undoubtedly contained. The only trouble was that the spinach was processed and excreted without the iron ever being extracted to benefit the body.

Dr. Schweigert also is concerned with one of the newer vitamins, the fabulous B12. For a while, one of the principal sources of this nutrient was one of the four stomachs of a cow—the rumen—but it is now known that the liver, kidneys and muscle tissue of animals, as well as milk products, eggs and fish, yield it in large amounts.

His research has led to the opinion that B12 facilitates or activates changes in body building. Radioactive tracers have been placed on the elusive vitamin to determine just how it goes about its business.

Since one milligram of B12 is so powerful it will treat 500 patients, the importance of this research becomes apparent. If Dr. Schweigert's research is successful, livestock can be fed diets rich in B12, thus improving the nutritional value of the meat. This, it is believed, will reduce the incidence of anemia to the vanishing point.

Some years ago, if a child was less than a year and a half old, he got no meat. But young Dr. H. W. Schultz of the Swift laboratories got the idea one night when he was scraping meat for his own child—more than a year and a half old at the time—that it would be fine if Swift came up with some prepared meats for such children.

One thing led to another and Dr. Schultz decided that it would be even better if it was proved that babies of any age could be fed meats. He started on his own

infants, even when the pediatrician said no. The results can be seen today on any grocer's shelves.

These meats, incidentally, have been fed to one and two month premature children at the University of Rochester in experiments financed by Swift. You can, in effect, feed a seven months baby a pork chop at birth and he'll like it and thrive on it. Not a real pork chop, to be sure—but its equivalent in a strained meat. Research also has shown that premature infants gain normal birth weight — the big problem in prematures — more rapidly on meat.

Other experiments are going on at the Universities of Nebraska and Minnesota. Those at Nebraska have shown that infants fed meat are more resistant to colds. At Minnesota they developed meats that are used where children are allergic to milk.

It is now thought that meats will play an important part in the other end of life as well—old age. Geriatrics is the science of old age and patients under examination at the University of Illinois College of Medicine, as well as at Barnes hospital in St. Louis, are being used in geriatric experiments. All are more than 65. It has been revealed that, when put on a diet of meat, these oldsters show increased vigor, more interest in life, and are better able to concentrate.

All of these programs have been conducted under grants from Swift.

Meanwhile, another whole universe of knowledge may be discovered as the result of Armour research in beef albumin. This substance has had an interesting history. During World War I it was used, strangely enough, to weatherproof airplane cockpits and fuselages. During World War II its role was more personal.

Back in 1940 the subcommittee of blood substitutes of the National Research Council asked Armour's scientists to begin research on bovine plasma. The object was to produce and process a bovine plasma that would be tolerated by the human system.

While they did not succeed, from the experiments did come knowledge leading to the development of a human albumin that is used in cases of shock. Armour built a plant at Fort Worth, Texas, to process the material for the navy. It is still in operation, processing now for the Red Cross. Toward the end of the war the albumin which, in solution, is five times the strength of ordinary plasma, was being used to spike transfusions of whole blood. It is so used in Korea today.

But the Armour researchers still have in mind the original purpose of the research: To find out how to process bovine plasma so that the human system will

tolerate it. No heterologous transplant—that is, the transplantation of tissue from one species to another — ever has been accomplished. If Armour's researchers succeed, they will have made a discovery as important to medicine as the splitting of the atom was to physics.

On a more mundane plane they also will have opened up another important source of revenue for the packers.

Such are some of the results of the meat industry's policy that old Stave Swift enunciated 70-odd years ago when he made his remark about not making money, but saving it — a remark even more true today than it was then, with synthetics and plastics moving in on the by-product market.

In Austin, Minnesota, at the laboratories of Hormel, is a young biochemist named Dr. L. E. Carpenter. He's presently trying to alter the genes of swine so as to produce a 60 pound animal for research in human diseases. This is because, oddly enough, there is a curious likeness between the respiratory system of a hog and that of a human being. A 60 pound animal, it is believed, will be much better for research than the ordinary one.

Dr. Carpenter believes he is about three years away from production of this artificially evolved swine. "When I get my pygmy," he says, "I'll not only have a fine research animal; I now know I'll also have a grade of meat beyond the wildest dreams of gourmets."

Ordinarily you wouldn't connect the prevention and cure of the common cold with a better ham sandwich, but that's the way it is in the meat business.

New Asphalt Spray Starts Seedings in Grass Waterways — A new asphalt looks good for holding soil, seed and fertilizer in place until a grass waterway, sloping lawn or highway shoulder is well established. After testing it three years, H. M. Smith, Illinois soils man, is enthusiastic. He has found it stops soil from washing and thus protects tiny seedlings as their roots take hold. Within a year the asphalt breaks down and no bad effects on the soil have been found. You spray the special asphalt, called Terolas and manufactured by the Shell Oil Co., on the soil immediately after seeding. Recommended rate is 2/10 to 3/10 gallon per square yard and slightly more on steep slopes. It makes a dry covering less than 1/16 inch thick which does not stick to your feet. Legumes and grass mixtures grow right through this covering. A three gallon orchard type sprayer with enlarged nozzle can be used to apply Terolas.

Get Two Lamb Crops a Year

C. E. Tilson

Condensed From The Southern Planter

SHEEP raising has long been one of the most important farming enterprises in the mountain empire of southwest Virginia. Probably no other single enterprise has brought farmers of this great agricultural area as much clear profit as has the flocks that graze these beautiful bluegrass hills.

Better farm management, improved pastures and better feeding practices have meant much to the sheepmen in modern times. These better methods have enabled the farmer to market higher quality lambs and get them on the market early, thereby receiving higher prices. The sheepman has been able to market more lambs per ewe.

The use of hormones in experimental breeding flocks in an effort to get two lamb crops a year has not proved of much value up to the present time. Since the results of these injections are not too encouraging, just how to get more lambs per ewe is still an important problem for the farmer.

Some information that might be of interest was obtained from a flock in Pulaski County, Virginia. Bobby Tickle, senior vocational agriculture student and president of the Draper's Valley FFA Chapter at Draper high school and his father, James L. Tickle, have had some degree of success in getting two lamb crops a year through good management methods. The Tickles have a flock of 30 ewes, from which 79 lambs, or an average of 2.63 lambs per ewe were raised to marketable age last year, due not to hormones, but to good farming practices.

The first crop of 42 lambs was marketed in June. From the second crop, which was born in June, 37 lambs were raised. Of these 17 were sold in November and 20 ewe lambs were kept to increase the size of the breeding flock.

All of the ewes have produced an abundance of milk at both lambing periods. Not one of them failed to produce enough milk for her lambs. This is important in getting the lambs off to a good start. The number of lambs grading blue in this flock has been outstanding. Out of the 42 lambs sold out of the first crop,

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Richmond 9, Virginia, May, 1952

40 graded blue and two graded red. Of the 37 lambs in the second crop, 17 buck lambs were sold in November and averaged $21 per hundred. These lambs were not graded in November. The 20 ewe lambs kept for breeders would be tops in any flock. Approximately half of the ewe lambs had been bred at eight months of age.

The two crops of lambs did not happen by accident. Mr. Trickle has been experimenting for the last few years, trying different management practices that might bring him two lamb crops a year.

Here is the way he does it. When the ewes lamb in November, they are put in a barn lot with the lambs and dry fed for several days—until the lambs are strong enough to go out on pasture and take all of the ewe's milk. They are then turned into a large field where strip cropping is practiced; where small grain and meadow strips provide good grazing. The rams have been on this winter pasture for some time. Usually, after the first week, and before the end of the second week, the majority of the ewes are settled with lamb and are on their way to the second crop.

Hot Weather Even Hard on Fish — Hot, dry weather is hard on fish in farm ponds, a Texas wildlife specialist reports. Shortage of oxygen is most common cause of fish die-off in summertime. They come to the surface gasping and swim into shallow water, sometimes jump out on the bank. Wave action is important to maintaining a supply of oxygen in the water. It helps to stir up the water with a boat and outboard motor when oxygen shortage symptoms appear, he says.

Two-Level Hay Driers— More and more farmers are using barn hay driers to improve quality of their forage. With a barn drier, hay can be brought in earlier and quality is greatly improved. But problems have developed in the drying process in the barn. Hay next to the air ducts dries out fine, but hay away from the ducts may not fare so well.

Wisconsin engineers found that air from the fan followed the path of least resistance out through the dry hay. They put in a two-level drying system. Air was forced into one drying duct until the hay around it dried, then was released into another duct, eight or ten feet above the floor and directly above the first duct. The rest of the hay is then dried. They got better quality hay, saved a lot of fuel by improving efficiency of the drier. —*Wisconsin Extension*

Mechanical Pit Cleaner Stops Wet Litter

Penn State Tries Placing Mash Hoppers, Waterers and Roosts Directly Over Droppings Pit

Gordon L. Berg

Condensed From Everybody's Poultry Magazine

A HUNDRED mature hens will void about 38 pounds of droppings daily. Those droppings will contain about 76 per cent moisture.

Ventilation, the sun shining in through the windows, the birds' own body warmth, heat given off by the litter, and heat retained by insulation have been relied on to take up excessive moisture in the poultry house.

The fact is, however, that dirty eggs are costing the poultryman much of his potential profits, which leads experts to think that the above factors are not doing a thorough job.

According to Dr. G. O. Bressler of the Pennsylvania State College, the average laying house in the Northeast catches only about 35 per cent of the droppings in pits intended for them. That means that for every 100 birds, 19 pounds of water are seeping into the floor litter every day.

How easily is this moisture removed? Not easily enough by ordinary means is Bressler's answer. That's why he helped Penn State agricultural engineers develop the poultry utility unit, which makes it possible for birds to perch, eat and drink over droppings pits.

"Wet litter is the major cause of dirty eggs," Bressler states. "Therefore, we set up an experiment in December, 1950, to determine the effects of perching, feeding and watering over a pit upon both litter and cleanliness of eggs."

A summer laying shelter was divided into two pens, each having an area of 216 square feet. Seventy New Hampshire pullets were placed in each pen. One pen was arranged in the conventional manner — droppings pits and two tier roosts in the rear, a 12 foot automatic mash feeder in the center, a five gallon water fountain near the door, and 20 nests along one side wall.

In the other pen, perches, feeders and fountains were placed over a pit 16 feet long and 7 feet

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wide. An automatic mash feeder similar to the one used in the other pen was placed lengthwise over the center of the pit. a 2x2 inch angle iron watering trough was mounted above the feed trough. A mechanical cleaner, with sliding arms operating in a "push-pull" manner, was installed in the pit to push droppings out of the building. Twenty nests were placed along the side wall.

"With four 48-hour sample collections of droppings taken from January to March, 1951, inclusive, it was found that from five to nine times more manure was obtained in the pit located under the perches-feeder-fountain arrangement than in the pit designed for night roosting only," Bressler reports.

In the same pen, the moisture content averaged 33.8 per cent, compared to 52.2 per cent in the other pen. How thoroughly the poultry utility unit cleaned the one pen was impressively demonstrated between February 23 and March 14, when the litter actually *dried* from 47 per cent to 36 per cent moisture! All litter had been removed from both pens on February 15 and four inches of sawdust (containing 40 per cent moisture) placed on the floors.

It was a very different story in the conventionally-arranged pen, where the litter became so saturated with water that it had to be replaced by January 26 and two bales of shavings added. From February 15 to the end of the test the moisture content steadily rose from 43 per cent to 57 per cent!

Figuring the moisture content of wet droppings at 76 per cent, about 17.2 pounds more water was added daily to the floor litter of the conventionally-arranged pen than in the pen adjoining it. An average of 27.6 pounds of droppings were caught daily in the droppings pit of the "automatic pen," compared to an average of only five pounds daily in the other pen. The remainder of the manure became part of the floor litter.

Egg cleaning became a much more pleasant chore when eggs from the drier pen were cleaned. Cleaning time from that pen averaged only 10 minutes per case, compared to 28 minutes per case with eggs from the conventional-type pen.

"The effect upon the litter other than reduction of moisture, due to daily removal of droppings, is not known," Bressler remarked. "However, the daily removal of manure would seem beneficial in lessening the load on the ventilating system."

At any rate, it would seem that the poultry utility unit has proved that (1) litter can be dried drastically by increasing the amount of droppings going into pits, and (2) cleaner eggs result.

Worth $100 an Acre for Grazing

Condensed From Capper's Farmer

THERE'S nothing new about utilizing small grain seedings for fall, winter and spring grazing. Progressive farmers have found that the green, high protein feed which stock can harvest for themselves more than pays its way.

Alfred Austin, Benton county, Arkansas, started 20 years ago with Lee winter oats. Through the years he has had his breeding program set up so cows freshen in the fall on small grain pasture. Then when pastures grow lush in spring he gets another bulge in milk production. Balbo rye and hairy vetch are his favorite combination crops.

"I figure every acre I put in small grain pasture is worth at least $100," says Alfred Austin. Many other farmers agree. So does "Hi" Staten, agronomist at the Oklahoma Experiment Station, after observing five years of tests there.

Just across the way from Alfred Austin's place is the farm of his son, Orville. This 70 acres is so well managed that it produces more income than farms two and three times as large. With Balbo rye, Orville comes close to having year around pasture for his Jersey cows and Hampshire ewes. He goes as far as he can on improved permanent pasture in the fall. About the middle of November he turns cows and sheep onto rye, seeded late in August or early September. This past season, which he terms, "unusually good," he got 106 days of pasture from a 22 acre field. Stock was turned off March 31 to let the rye make a grain crop.

"If your need is for fall pasture," says Orville Austin, "sow oats or barley. If you want winter pasture, sow rye and don't graze it in the fall, because you can't grow pasture in winter. If you want to harvest a grain crop take stock off rye the last of March and top-dress it with 100 pounds of ammonium nitrate an acre."

In Kay county, Oklahoma, Mike Schiltz combines a commercial Hereford cow herd and a flock of 40 to 45 Shropshire ewes on his 587 acre farm. His favorite winter and spring pasture crop is wheat and hairy vetch. He

Reprinted by permission from Capper's Farmer,
Topeka, Kansas, July, 1952

also grows seed wheat and pastures this, turning off about March 15 to let the crop make grain. The wheat and vetch combination is grazed straight through.

Schlitz thinks vetch, which he has grown since 1936, is the greatest thing that ever hit his farm. The way it builds soil is obvious from yields on following crops. Its roots loosen the soil, giving it better tilth, cutting down power requirements for plowing. Wheat and vetch are seeded early in September. Last fall the whiteface cows started grazing it October 25.

Raymond Bollman, Labette county, Kansas, finds winter wheat excellent for increasing pasture days as do many central and eastern Kansas dairymen. Bollman grows Clarkan because he likes its straw. He turns off around mid-March and takes a grain crop. To eliminate danger of off-flavored milk he handles cows when they're on wheat pasture this way: After the morning milking they go to the feed bunks to eat hay for an hour. Then they eat their fill on wheat pasture until noon. The rest of the day they're off wheat.

Giving milk cows or grazing cattle access to dry feed is recommended by the Kansas station to prevent losses from bloat and "wheat poisoning." Continuous rather than intermittent grazing also helps prevent losses from these causes.

Small grains, especially rye, fit neatly into the swine producer's program. S. W. Terrill, animal science department, University of Illinois, says: "We are thoroughly sold on use of rye to extend the pasture season through fall, winter and early spring.

Basil Slagle of Brown county in west central Illinois says that a six acre rye pasture saved him $540 worth of feed from September to February 10. He bases his figures on corn at $1.90 a bushel and protein supplement at $110 a ton. The pasture was seeded August 15. On September 10, Slagle turned in 20 gilts. A month later he took the gilts off and turned in 20 sows for two weeks. From October 24 until December 1 he had 165 head of fall pigs on the pasture. On December 1 he took them off and put on 17 gilts and 115 pigs.

Rye is advocated for pasture in our northern states, too. Swine and dairy specialists at Michigan State College say there's nothing to beat Balbo rye for fall and early spring pasture. Seeded in late summer, it can be pastured by swine as late as early December. For dairy cattle, light pasturing from the middle of October to the middle of November is recommended. It pays off handsomely for the dairyman in the spring with high carrying capacity

from around April 15 to May 15 when other pasture would be damaged by grazing.

Pennsylvania station says that if forage production from small grains is desired, heavy fertilization and early seeding are essential. In tests, seedings were made five weeks earlier than the recommended date for grain.

You've heard that grazing of small grains will increase grain harvest. In the Pennsylvania experiments fall-clipped grains often yielded better than those not clipped. And when grain yield was reduced by fall clipping the combined grain and forage yields, figured in total digestible nutrients, was greater than that from the unclipped seedings.

Nitrogen fertilization proved especially beneficial in the Pennsylvania tests. Eighty pounds of nitrogen plus 400 pounds of 0-20-20 an acre gave bigger yields, with a higher protein content, than 40 pounds of nitrogen with 400 pounds 0-20-20. The heavier nitrogen application also held up grain yield on clipped seedings.

Application of 40 pounds of nitrogen in spring stepped up yields of forage and grain in seedings which had been clipped in the fall. On those not clipped in the fall, straw growth was stimulated at the expense of grain production and severe lodging occurred in several instances.

Farmers who are successful in pasturing the small grain seedings are not a bit allergic to fertilizer. "I can remember," says Alfred Austin, "when we used 150 pounds of mixed fertilizer an acre and thought we were going pretty strong. Now I use 350 pounds of 4-12-4 when I seed vetch and rye and 400 pounds on winter oats. Then in the spring I top-dress the oats with 100 pounds ammonium nitrate. However, I don't top-dress the vetch and rye as the legume takes care of the nitrogen needs nicely."

Orville Austin used 450 pounds of 4-12-4 an acre when he put in the 22 acres of rye last fall. If he's planning to take a grain crop he turns off the rye the last of March and top-dresses with 100 pounds of ammonium nitrate. Mike Schiltz recently spread 1,000 pounds an acre of ground rock phosphate on his land. In the first seeding of wheat and vetch after this he used 200 pounds of 4-16-0. This year he plans to use 60 to 75 pounds of 8-32-0 at seeding time.

Some question whether you can afford to establish a small grain seeding for pasture only. It does cost money. Here are Orville Austin's cost figures on a per acre basis:

Plowing eight inches deep in August	$ 2.50
Disking and dragging three times	3.00
Drilling seed and	

fertilizer	1.30
450 pounds 4-12-4 fertilizer	9.45
1½ bushels of Balbo rye	3.75
Total	$20.00

"It's hard to say just how much value you can place on rye pasture in dollars and cents," Austin says. "I think many farmers don't take into consideration the better health of the animals, the extra milk from cows, better lamb and wool crop from sheep, labor you save when the animals are on pasture, and manure and liquid fertilizer back on the land where you want it."

Artificial Breeding Uses Best Bulls— Last year, about 3,500,000 cows were bred artificially. That's about 15 per cent of all the milk cows in the United States. In some leading dairy states, the percentage bred artificially ran as high as 25 per cent. U.S.D.A. dairy specialists predict that, in a few years, a large percentage of all cows in commercial dairy regions will be descendants of select sires used in artificial breeding associations. These associations now operate in 47 states, Alaska and Puerto Rico. They provide an effective way of making use of the outstanding bulls developed in the dairy herd improvement associations.

At the beginning of 1951, more than 4,000,000 cows were enrolled in 1,650 artificial breeding units. Those units owned or leased more than 2,000 bulls, or about one bull to each 1,900 cows enrolled. Nearly a third of those bulls had been proved with D.H.I.A. records which indicated an average of 459 pounds of butterfat produced by the daughters of those sires, or 40 pounds more butterfat than had been produced by their mothers.

Farm Costs Are Higher — Farmers will pay more out of their pockets to run their farms this year than ever before in history, according to I. F. Hall, University of Wisconsin. Farm costs during the first three months of 1952 were up four per cent from a year earlier. Only prices paid for feeder cattle and building materials were lower than last year.

Top-of-Ground Silos

Bryan Boatman

Condensed From Farm Journal

HUNDREDS of farmers tried stacking grass silage in top-of-the-ground silos last summer.

How did it work out? Were farmers satisfied with the results? What's the score on this top-of-the-ground method by now?

To get answers, I talked to 56 Iowa and Illinois farmers, and found that practically all of them liked their top-of-the-ground "silos." Only one said he wound up with downright poor silage. The other 55 were, in the main, well satisfied, although a few felt that spoilage ran a little too high.

How much spoilage do you get? These farmers reported all the way from four per cent to 15 per cent. Average was 5.7 per cent. (We went out and measured 24 stacks ourselves. They averaged six per cent spoilage.)

What about quality of silage? We didn't guess on this one, either. We took 63 samples of silage from 12 different stacks, and sent them to Dr. S. T. Dexter at Michigan State College. He tested the silage for moisture, protein and acidity.

In simple terms, Dexter's report showed that 89 per cent of the silage in these stacks rated "very good," and five per cent rated "good." That pretty well answers the question of quality.

Most of the 56 farmers that I talked to plan to make top-of-the-ground silage again this year. Here are some of their ideas on how to make good quality grass silage in an outdoor stack:

1. *Locating the stack.* Pick a spot that you'll be able to get in and out of when the frost comes out. Some farmers had to quit feeding last spring because of mud. Either pick a site that won't get muddy, or one that you can keep from getting that way. That means level ground, or better yet the top of a knoll—*never in a depression.*

Make sure you have plenty of clearance at the ends—at least 50 feet—to get in and out during both filling and feeding. Have it as handy as possible to where you're going to feed. Stay away from places where snow drifts in.

Finally, remember that grass silage has quite a whiff to it—not exactly a parlor odor, either. Put the stack a good distance

Reprinted by permission from the Farm Journal, Philadelphia, Pennsylvania, June, 1952

from the house.

2. *Bottom or floor.* Not less than 20 feet wide, nor more than 24. You can make it narrower, but the best stacks I saw were about 20 feet wide, 75 feet long, and averaged seven feet in height *after settling.* (Length depends entirely on how much silage you want to put up.)

The floor should slope a foot or two (some say three feet) from end to end for drainage. Crosswise, it should round up to a six or 12-inch crown in the middle.

Surface silos are cheap to build. Those I saw cost between $18 and $25. Some farmers built them with a moldboard plow and tractor loader, and others used small bulldozers or road maintainers.

3. *Sidewalls or berms.* Ridge with dirt on each side to a height of about four feet. That's to give your stack form and stability, and to keep it from squashing out at the bottom from the pressure of packing and settling above.

"Bunt the sidewalls in tight against the silage after the stack is built," says William Zenishek, Johnson County, Iowa. "This keeps water from running down inside between the earth and the silage, and cuts down spoilage."

4. *Harvesting and stacking.* Chop in the field, and haul with dump trucks or wagons equipped with unloaders. (Drive the truck right over the stack and dump while on the move.) Use a tractor with blade, or a tractor mounted cultivator (remove the shovels) to level out the silage.

5. *Shape of stack and packing.* Build the sides straight, no bulge, and no crown until ready to top out, and then only a slight crown. "We rounded our stack too much at the top," says Bernard Campion, Johnson County, Iowa.

If you keep the sides perpendicular, you'll be able to pack along the edges with your tractor without tipping over. If you use a tricycle-type tractor, be sure to space wheels as far apart as possible. Tipping is a real hazard.

Keep a tractor going back and forth all the time. Pack the silage as solid as you possibly can—so solid that you can hardly see where you've walked on it. Packing is slow, monotonous work, but a loose stack means mouldy silage all next winter.

Calvin Yoder, Johnson County, Iowa, packs his stacks again two or three days after he finishes chopping. (Some farmers pack every day for five or six days after the stack is completed.) Yoder, incidentally, didn't use any covering last year; had only four per cent spoilage.

Most of the others used some sort of covering — dirt, sawdust, finely ground limestone. From what I saw, covers reduce spoilage, but when the silage is packed until solid, the reduction in spoilage is small — probably not

enough to make the cover worth while.

How do you get the silage out for feeding? Most of these farmers scooped it directly into the bunks with their manure loaders.

"We fed 174 head of cattle in 30 minutes with the tractor loader," says Bernard Campion, who put 85 acres of legume-grass silage into his surface silo, and he also reported that "at no time last winter was freezing a problem."

Some of these farmers used a preservative, others didn't. Both methods gave good results. However, recent experiments at the Purdue Experiment Station show that you get better grass silage if you chop without wilting, and add dry material to soak up the extra moisture.

* * * *

Soil Test Living Crops

A little box—symbol of another advance in the march of scientific progress—is helping remove the last vestige of guesswork from fertilizer recommendations.

This latest gadget is a kit for testing growing plants for the presence of essential plant foods. It is called tissue testing, because it tests tissues of plants for the presence of nitrogen, phosphorus and potash. Soil specialists are keen about this relatively new method —the quickest yet devised to verify deficiency symptoms in growing crops.

To make a test, the farmer with sickly looking, "fired" corn cuts a section from a corn stalk, squeezes the sap or juice onto a filter paper. From a bottle marked "Nitrate Test Powder," he sprinkles a little powder on the paper. If the plant contains sufficient nitrate, a pink color appears on the paper in three to five minutes. Absence of color denotes nitrogen deficiency. Tests for phosphorus and potash are just as simple.

You will agree, there is nothing like seeing first hand just what your crops need in the way of plant food and being able to do something about it. —*Arkansas Extension*

* * * * *

If you want one of the kits described above, send $4.25 to Farmer's Digest. We will forward your order to one of the few suppliers. Kit makes 100 tests of each element.

Do You Know?

Locusts and Cicadas have long been included in the human diet, the American Indian considering them delicacies when roasted. The Bible refers to the locust or cicada as food.

Total Number of Casualties from disease, chiefly smallpox, during the Revolutionary war will never be known, but it is claimed they represent one-fifth of the total number of American soldiers enrolled.

To Lose a Pound of Body Fat by dieting is simple, but to lose the same pound by physical activity it would be necessary for a person to shovel 114,000 pounds of sand or run 43 miles.

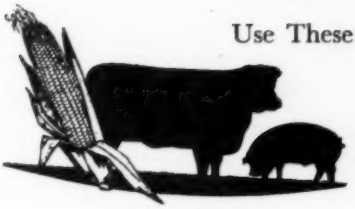
An Improved Margarine said to have the body and texture of butter is now being produced through a churning method. Still another margarine that doesn't spatter when fried, that browns evenly and tastes better, is claimed by another manufacturer. The secret is a tiny fraction of lecithin, contained in soybeans.

Pears, Apples and Oranges the size of grapefruit can reasonably be expected in the future says a scientist at the University of Illinois. Chemicals will do it. Plant specialists will also reduce the size of the trees on which they are grown and fish will be grown on "ranches" of fenced-off water, he forecasts.

Thirteen Per Cent More Cattle Were on Feed July 1 in 11 cornbelt states than on the same date last year, according to USDA figures. The increase is due to smaller marketings of feed cattle and to larger number of cattle placed on feed as compared to the 1951 period, when number of cattle going on feed was exceptionally light.

Mosquitoes Like Chickens — The Alabama Experiment Station has found that mosquitoes like chicken blood better than the blood of dogs and pigs. When mosquitoes had free choice of animals, 47 per cent fed on chickens, 33 per cent on dogs and 13 per cent on pigs. Hens protected from mosquitoes laid eggs at the rate of 61.5 per cent; not protected, only 56.7 per cent.

Road to Efficient Farm Production



Use These Recommendations as a Check List

Against Your Own Operations

Condensed From the Ohio Farmer

LIVESTOCK

LIVESTOCK men can achieve greater success by doing a better job in the five production areas of selection, breeding, management and marketing.

Dairy Cattle

In Ohio, as in other midwestern states, cows get about 70 per cent of their total nutrient supply from hay, pasture and silage, and 30 per cent from homegrown grains and purchased concentrates. Current milk production is about 5,500 pounds per cow.

More and better roughages and pasture should increase total dairy cow feed intake and stimulate production. Use grassland crops more efficiently by:

Ensiling a larger portion of hay crops.

Mow drying hay crops where economically feasible.

Pasturing more intensively with more frequent rotation of cattle from field to field. Using electric fence.

Earlier cutting of hay crops.

Use grain crops more efficiently by:

Feeding a larger proportion of roughage crops with grain.

Balancing grain rations.

Feeding animals according to productive ability.

Eliminate low producers and feed better cows more liberally. Improve herds by better breeding and production testing. Eliminate or cure diseased animals, practice rigid sanitation and good management to prevent disease.

Beef Cattle

One of the great wastes is the loss of beef that might be profitably gained by improving harvesting and storing methods that include consideration of the value of roughage as well as grain. There are thousands of tons of roughages containing large quantities of expensively produced feed nutrients suitable for cattle feed now wasted or lost.

Select feeders according to kind of feed, feeding plan to be followed and season of marketing.

Select breeding cattle with good, beefy conformation and

Reprinted by permission from the Ohio Farmer, Cleveland, Ohio, March, 1952

sound skeletal structure, with known ability to gain rapidly on roughage.

Breed nothing less than choice cattle.

Plan for spring calves to make maximum use of pasture by both cows and calves.

Feed silage for greatest beef efficiency.

Keep productive cow herds on pasture, hay, stover and cereal straws. No grain or supplements are necessary.

Reduce labor load by using automatic and self-feeding equipment.

Buy pasture cattle in fall. Winter on roughage.

Provide inexpensive, minimum amount of shelter.

Finish cattle according to market grade.

Observe seasonal and market demands for grade, quality and finish.

Consider raising your own feeders. This plan is best suited to conservation farming and has fewer risks for young farmers, small feeders and those less experienced.

Sheep

Maintain only healthy breeding ewes. Cull breeding flock for uniformity. Keep production records.

Breed ewes to purebred rams with known lamb and wool production.

Grow and feed breeding ewes legume hay for basic winter ration.

Feed grain before lambing and during nursing period.

Fit sheep program to crop rotation; provide supplementary pasture.

Keep flock healthy by:

Drenching at least three times per year with phenothiazine-lead arsenate drench.

Feeding phenothiazine - salt mixture (1 to 9) during grazing season.

Dipping or spraying your sheep flock for ticks, lice and scab.

Rotating sheep on pasture monthly to obtain fewer parasites and more feed.

Provide adequate shelter, grain troughs and hay racks. Protect lambs from chilling.

Keep sheep dry before shearing. Shear on clean floor. Tie each fleece with wool twine.

Plan lamb and wool production to take advantage of market demands.

Market lambs and wool on graded basis.

Swine

Select swine type that performs best in reproductive ability, in feeding and gaining ability, and that satisfies modern market demand in carcass yields.

Use two litter system—farrow in February — March, and in August—September.

Pasture swine on legumes.

Supplement rations with protein, vitamins and minerals.

Pay strict attention to sanitation.

Use latest parasite remedies.

Top-out hogs at best market weights—200-220 pounds.

Move hogs carefully to prevent shipping losses.

Poultry

Purchase best available chicks for top egg and poultry meat production. Purchase chicks from hatcheries doing a good job of breeding, selection and pullorum control.

Reduce waste of feed. Fill feeders only one-half to two-thirds full to stop billing out. Feed best ration available. Use proper size feeders.

Produce quality eggs. Gather eggs frequently, cool quickly and market twice per week. Market eggs on quality and size basis.

Use legume poultry range, where possible, for pullets, turkeys, roosters and capons for efficient gains.

Use labor saving devices.

CROPS

IF WE ARE to increase the efficiency of crop production, these points are important:

1. Have soil tested. (See your county agent.)

2. Develop a sound cropping pattern suited to your soil, type of farming and available help and equipment. Give greater consideration to soil building crops, water, tilth and organic matter.

3. Determine what fertilizers are best for you, where they can be used most efficiently and how much you need. Order and get it early.

4. Continue your lime program.

5. Increase yields and quality of sod crops to improve soil productivity, increase grain yields and provide needed livestock feed.

> An extra ton of hay per acre or its equivalent in pasture or silage contains about the same amount of digestible nutrients as 23 bushels of corn and may be produced with less labor and at lower cost.

6. Use green manure crops, such as sweet clover or alfalfa, in the corn-oats rotation and rye grass and yellow-sweet clover in corn.

7. Use crop varieties best suited to your conditions.

8. Use best cultural practices. Avoid plowing and working when wet, place seed at correct depth and fertilizer at right position.

9. Reduce livestock demands for human food items by providing a better and more constant pasture supply.

10. Make your plans early and act. Timeliness costs little and pays big.

11. Improve drainage (surface and subsurface). This saves wear on machines, permits more timely

planting and increases yields.

12. Irrigate high value or special crops.

13. Give machinery care and adjustment. This promotes long life, efficient operation, low cost and maximum production.

14. Operate machines correctly. This improves seed bed, lowers power requirements and makes planting more accurate.

15. Plan adequate storage facilities early. Provide for drying plus insect and rodent protection.

Rotation Hay and Pasture

Use more fertilizer when establishing stand.

Apply lime where needed.

Use suitable seed mixtures. Add one-half pound ladino to all mixtures for pasture or hay and pasture.

Use best legume and grass varieties.

Inoculate legume seed.

Sow legume seed early in spring, use band seeding method if drilling.

If legume seed is drilled in spring on wheat land, use 150-200 pounds 0-20-0 or 0-20-10 drilled with legume seed.

Clip stubble and remove straw after harvest, especially if wheat straw.

Do not overgraze the first season.

Protect new seedings and hold over meadows from grazing after September 10 in northern Ohio and September 20 in southern Ohio.

Top dress meadows before second hay year with 250 - 300 pounds 0-10-20, 0-20-20 or 10-10-10 per acre depending upon legume content. Use a higher rate of 10-10-10 on pure grass and low legume content meadows.

Control insect and disease damage. (See your county agent.)

Wheat

Use a recommended variety.

Seed as soon as possible after fly-free date.

Prepare a good seedbed.

Fertilize liberally.

Permanent Pasture

Lime as needed. Manure and fertilize liberally at least every two or three years on sod at any convenient time.

Provide earlier pasture as needed by applying 40-60 pounds of nitrogen per acre in fall or early spring on good grass sods, or by seeding rye.

Provide additional midsummer pasture to better utilize permanent pasture when it is most suitable for use. This extra may come from alfalfa—ladino—grass, sudan grass or birdsfoot trefoil with orchard grass or bluegrass.

Introduce other permanent pasture legumes such as ladino clover, and birdsfoot trefoil where appropriate. Seed lespedeza in southern Ohio.

Graze to capacity; do not overgraze.

Mow as soon as growth begins

to get ahead of livestock, or when weeds develop.

Corn

Plant newer and higher yielding hybrids.

Treat seed and observe planting date to avoid heavy corn borer damage.

Adjust planting rate to productive capacity of land. Here is rate of planting for 40-inch row width:

On land capable of producing 50 to 75 bushels per acre a planting of three kernels per hill at 13-inch spacing in the drilled row equals 11,760 kernels per acre.

On land capable of producing 80 to 100 bushels per acre or more, four kernels per hill or a 9 to 10-inch spacing in the drilled row equals 11,760 kernels per acre.

Or a planting rate of any row width that will result in 13,000 to 14,000 plants per acre at harvest time on the more productive soils.

Increase acre rate of fertilization. Here are suggested recommendations to increase yields:

Fertilizer in row — 300 - 400 pounds per acre or more.

Nitrogen plowed under or drilled four inches deep between rows after corn is up—60-80 pounds actual nitrogen per acre (185-225 pounds ammonium nitrate or equivalent.)

Plant on contour on sloping land.

Use planter seed plates that conform to size of kernel and pull planter at rate that permits accuracy in planting.

Put plants closer in row and increase width between rows. This reduces time required to plant and cultivate and does not reduce yield.

Soybeans

Use variety recommended for your area and condition.

Control weeds where a problem by:

Plowing and cultivating before drilling solid; or

Planting in rows and cultivating as corn.

Lime adequately. Soybeans on acid soil give large returns for lime.

Inoculate seed.

Use fertilizer unless rotation is otherwise adequately fertilized.

Oats

Use a variety recommended for your area.

Seed early.

Fertilize adequately.

Although the national gross farm income in 1951 hit a new high of $32,791,000,000, so did farm production expenses, leaving a net income of only $14,900,000,000, or some $2,000,000,000 less than the postwar high in 1947, according to the Bureau of Agricultural Economics of the United States Department of Agriculture.

New Sanitizer for Your Milking Machine

A. C. Dahlberg and F. V. Kosikowsky

Condensed From The Rural New Yorker

RECENT advances in the development of new water softening, washing, wetting and sterilizing compounds have renewed interest in simplified procedures for sanitizing milk machines.

The task of washing milking machines is an important labor item on the farm. If the rubber parts of the average milking machine were to be taken apart completely after each milking, scrubbed with a brush and reassembled, the task presumably might be done in about 15 minutes per day for two single units. This would require about 91 hours per year or nine days per farm, the equivalent of the services of about 750 men on New York state farms. This washing time would equal about 13 per cent of the total time the machines are in use so that one hour would be spent washing for every eight hours milking. Actually, few dairymen today take the milking machines entirely apart after each milking nor has this been generally done since milking machines were introduced on farms in this country.

Sanitizing Solutions Are Not Always Effective

A study in the Department of Dairy Industry at Cornell has shown that the use of lye as a sterilization agent for rubber parts on a milking machine is still the most effective means of sterilizing. A lye solution is also a very effective cleansing agent. However, though lye treatments are cheap, lye solutions are very caustic and may freeze during winter months.

The study was begun in 1946 with the hope of demonstrating that quaternary ammonium solutions would effectively sanitize milking machines. Results during this first summer demonstrated that the almost neutral quaternary ammonium solutions would not effectively sanitize milking machines either by rinsing, followed by dry storage, or by wet storage. Several such solutions were being offered commercially to dairymen. Bacteria counts were high, machines did not look clean, and their use on one farm coincided with several outbreaks of mastitis where the organism Pseudomonas was present in large

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333 W. 30th St., New York 1, New York, June 21, 1952

numbers. It is a known fact that quaternaries are not very effective in destroying this organism.

Detergent-Sanitizer Proved Effective

Further research at Cornell in 1947 and 1948 demonstrated that more favorable results could be obtained by combining the quaternary ammonium compounds as a powder with large concentrations of certain high alkali washing powders and a complex alcohol. This compound was called a detergent-sanitizer. It not only proved effective in controlling bacteria counts and keeping machines clean, but it had an added advantage of being labor saving since, in using it, the washing and sterilizing steps were combined. In such a mixture, the water softening compounds improve the cleansing ability of the quaternary; the high alkali compounds are detergents and the alkalinity itself is germicidal; the wetting agent improves penetration of the ingredients to do their job on all surfaces of the rubbers or metals; finally the quaternary does the task of destroying bacteria. Hence, the mixture cleans, and kills bacteria, and is known as a sanitizer or a detergent-sanitizer. Of course, it is necessary to have ingredients that are compatible with each other, so that one compound does not combine with another to make a new compound without the characteristics desired.

Use of Compound on the Farm

In applying these new detergent-sanitizers to cleaning on the farm, a one-half hour soak of the partly disassembled machine in the hot solution once a day, usually after morning milking, proved to be highly beneficial. Details of the complete method are presented in a recent publication, available on request to Cornell university, Ithaca, New York.

The detergent-sanitizer developed at Cornell, and known as the Cornell Sanitizing Powder, is a mixture of the following: Trisodium phosphate 30 per cent, Tetrasodium pyrophosphate 30 per cent, soda ash 26 per cent, wetting agent (complex alcohol) seven per cent, quaternary powder seven per cent.

At present, many of the combination detergent-sanitizer powders of this nature, that are used in the field, are closely patterned after this formula or are the same combination. It should be pointed out that the water softeners and alkaline compounds are not sufficiently soluble to make up as a clear stock solution, but the dry powder can be added to the water at the time of use to make a perfectly clear sanitizing solution.

These new washing compounds do not eliminate the need for hot and cold water for rinsing and washing the equipment, but they make an easier job of the sanitiz-

ing of milking machines. At the same time the sincere desire and effort to have clean and sterile milking machines, on the part of the person responsible for sanitizing them, is as important in obtaining clean, sterile milkers as the method by which it is accomplished.

A Word About Thermodurics

Much emphasis has been given in various writings to the control of thermoduric bacteria by the quaternary ammonuim compounds. In the research herein reported, occasional tests were made for thermoduric bacteria but appreciable numbers were never found even when the total counts were high and the rubber tubes were dirty.

It would appear that thermoduric bacteria (those bacteria which survive pasteurization) were easily controlled by all comparative sanitizing methods used in this research, including lye and chlorine treatments.

Male Hormones Save Feed, Speed Gains in Beef Feed Tests — A new way to save feed while fattening beef cattle has been reported. Male hormones produce increased rate of gain on relatively less feed, according to Dr. Ralph Bogart, animal husbandman, Oregon State College. Testosterone, the male sex hormone, was injected into the muscles of animals in trials last year. Increased gains of .4 of a pound per day were obtained. Feed savings amounted to nearly 150 pounds of feed for each 100 pounds of gain.

New tests are under way this year. The aim is to find a more practical method of giving the hormone. Now they are mixing the testosterone right into the feed and results to date are promising. Tests were started to learn whether the male hormone causes bulls to gain more rapidly than steers and both to put on weight quicker than heifers.

Injections, while boosting the gains by heifers, did not quite bring them up to the level of steers getting the hormone. Heifers with testosterone gained 2.5 pounds daily while steers with the same treatment gained 2.7 pounds. Without the hormone, heifers gained 2 pounds a day and steers 2.4 pounds.

No ill effects were reported when the carcasses of the test animals were examined. They were marketed at 800 pounds with only a slight tendency toward bullishness showing in one or two animals. Heifers did show a higher proportion of rear to front quarters than steers.

—Oregon Extension Service

A Farm Story

THE WIDOW'S WAY

Henry Exall

That Farmers Need Sharp Wits as Well as Pruning Hooks, the Author, a Dallas Businessman, Proves in This Story, Wryly Told

THIS old lady Newberry was a widow woman with seven children, but, man, she was a farmer. Or so I've heard. Anyway, she made a good living out of her blackland beginning when Dink Newberry died. Dink had tried being a lawyer, and then went into the undertaking business, and he was a barber for a while, but finally he made a success and got back to the soil. That was when he married Miss Willits and her blackland farm, the same being the Mis' Newberry I'm speaking of. Well, Dink said the earth was the basis of all wealth and he had 350 acres of it, and he settled down to steady drinking of red eye whisky till he got into a fit and died. That bereavement seemed to give this widow woman new life and ambition. She got active as a cat and hired her some hands and worked them till hell wouldn't have it. She cleared all the Johnson grass off her farm and wrote down to the A. &. M. college for bulletins and planted milo maize between the cotton rows. She was a farmer. Clearing that Johnson grass was a job. It'll grow and prosper on a marble slab, and on blackland, Grandpa's toenail slipped and tore the sheet! That stuff is hell—money, marbles or chalk.

The Dayo brothers over across the creek from the widow were given up to have the best farm in the section and won the county prize for cotton, grain and hogs time out of mind. But the widow splattered them and took all three prizes herself. These Dayos were an onery outfit and mean enough to steal sheep, and they were plenty sore on the widow. She ordered her a carload of fertilizer to whoop up her crops for the next year. The railroad set out a car on the Sayso siding about dusk one night, and when she

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came up with her wagons to unload it next morning it was gone. Stole. Well, that fertilizer looked just like river silt and every farmer around was using river silt, so she didn't have any luck tracing who stole it. A 9 year old child might 'a' figured who it was, but the widow never let on, and kept tighter than a Pullman window. She ordered her another carload. People were sort of sorry for her. Even the ones that had been against a woman making a success. But a success in farming is about like being promoted to be corporal in the army after 20 years. And everybody knew the loss of that carload set her back.

When the second carload came and was stole like the other, the whole section was in a high dudgeon and said things had come to a hell of a pass.

But the widow didn't do anything about it. They said she ought to have had the car guarded and been on the watch-out to get the thieves. But then a widow woman is pretty helpless, and her with all them children. She was a blonde woman with her hair parted in the middle, and she was stringy built and droopy looking like life was too heavy for her.

So everybody said, "Well, the Dayo brothers got her whipped down and they'll take the prize this year."

It was August or May or June or sometime. I'm a pipefitter myself and all I know is what this country friend of mine told me. Anyway, everybody had planted cotton. The widow didn't let out a syllable for something over three weeks and then she came out with handbills and had them stuck up in every fencecorner and cross-roads in the country. Gentlemen, the Monday after that handbill came out you couldn't stir the people in wagons, horseback and afoot on the Valley Pike by the Dayo farm with a stick. There was green stuff coming up all over the Dayo land and it wasn't cotton. It grew a foot while you were looking at it. And people figured maybe it would get to be 50 feet high. Some said 30, some said a hundred. Like once I saw a guy hit on the chin and it stretched his neck about six or eight inches.

The widow's handbill was like this:

> To the low, malicious thieves that stole my fertilizer. I ordered that second carload mixed with Johnson grass seed. I ordered it so as to catch you, and bring ruination upon you.

This is a story my country friend told me one day over a bottle of three-two. His name is Ollie Snook and he lives at Four Oaks.

BEEF CATTLE

Marketing Alfalfa-Brome ....Jan., 1952
Silage for Beef Cattle .....Feb., 1952
Spuds into Steers .....Feb., 1952
Cheaper Beef Gains .....Mar., 1952
Hormones Lower Beef Costs..Mar., 1952
Nutrition During Gestation ..Mar., 1952
The Best Steer to Eat Grass..Apr., 1952
Beefmasters .....Apr., 1952
Lowering Beef Cattle Costs ..Apr., 1952
Brangus Cattle .....Apr., 1952
Calving to Market at 15 Mos..May, 1952

CONSERVATION

Tall Fescue for Trouble Spots.Dec., 1951
Flood Control Program .....Jan., 1952
Clean Streams .....Jan., 1952
New Nursery Methods .....Feb., 1952
A Ground Cover for Sandy Soils .....Apr., 1952

CROPS

Ever Looked at a Seed Tag? .Oct., 1951
Nutmeg—Settler in the West .Oct., 1951
Legumes Promote Miracles ...Oct., 1951
Reed Canary Grass .....Nov., 1951
Seed Wheat by Thermometer.Dec., 1951
Hurry-up Seed Plan .....Dec., 1951
Put Boxing Gloves on Your Seeds .....Dec., 1951
Climate Calendar—Crops on Time .....Feb., 1952
Feed Your Forage Crops ....Feb., 1952
Producing Small Grain .....Feb., 1952
How Does Your Corn Grow?.Mar., 1952
Ladino Clover .....Mar., 1952
How to Choose a Hybrid Corn .....Apr., 1952
More Corn on Less Land ....Apr., 1952
Corn Production .....Apr., 1952
Growing Brome Grass .....May, 1952
A Corn Champion's Story ....May, 1952
Make Corn Your Nurse Crop..May, 1952
Irrigation .....May, 1952
Better Grass for More Corn ..May, 1952
Red Clover Comes Back .....July, 1952

DAIRY CATTLE

Long-Lived Cows .....Dec., 1951
Calf Nutrition .....Dec., 1951
How to Dry Off Cows .....Dec., 1951
What If You Miss a Milking..Dec., 1951
Calf Scours .....Dec., 1951
Less Udder Trouble .....Jan., 1952
A New Market for Milk .....Jan., 1952
Let the $ Sign Be Your Guide.Feb., 1952
Using Nurse Cows .....Feb., 1952
Sundown for the Milk Can ..Feb., 1952
Calf Scours Controlled .....Mar., 1952
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Outwitting Mastitis .....Mar., 1952
Typed Classifications .....Mar., 1952
New Breeding Remedy .....Apr., 1952
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Herd Sire Index .....Apr., 1952
Cow Comfort and Ventilation.Apr., 1952
Improving Dairy Herds .....Apr., 1952
Calves Need Roughage .....Apr., 1952
Poor Milking Cuts Milk Flow.May, 1952
Calf Management .....May, 1952
Herd Sire Problem .....July, 1952
Improve Butterfat Test .....July, 1952
Cut Chore Time .....July, 1952

FARM BUILDINGS

Barn Ventilation .....Oct., 1951
Cow Comfort and Ventilation.Apr., 1952

FARM MANAGEMENT

It Takes More Than Money ..Dec., 1951
Keep Your Hired Man .....Nov., 1951
When to Hire, When to Buy.Dec., 1951
Farm Doubles Its Production.Feb., 1952
Cutting Production Costs ....Mar., 1952
Livestock Bruises Cost Money .....Mar., 1952
When You Buy Credit .....Apr., 1952
I'll Be Suing You .....May, 1952
Oil Under Your Farm? .....May, 1952
Don't Buy a Fooler Farm ...July, 1952
Lease That Will Last .....July, 1952

FARM EQUIPMENT and MACHINERY

Self-Feeding Silos .....Nov., 1951
Winter Care of Machinery ...Dec., 1951
Putting the Heat on Piping ..Dec., 1951
Side Opening Milk Cooler ....Jan., 1952
Yard Lighting for the Farm..Jan., 1952
Whirlwind Milking .....Feb., 1952
Periodic Oil Changes .....Feb., 1952
Sundown for the Milk Can ...Feb., 1952
How to Buy a Well .....Mar., 1952
Fuel for Farm Tractors .....Apr., 1952
Farming With LP Gas .....July, 1952
Portable Electric Motors ....July, 1952

FEEDS

Soybeans in Dairy Rations ..Dec., 1951
Feeding Experiment .....Dec., 1951
Place of Silage on the Farm..Dec., 1951
Feed Your Forage Crops ....Feb., 1952
Make Good Use of Your Feeds .....Feb., 1952
Results in Livestock Feeding.Feb., 1952
Citrus Pulp for Dairy Cows..Apr., 1952
Backaches Vanish .....May, 1952
What Are Vitamins? .....May, 1952
Too Much Sunshine .....July, 1952
Silage, Sulphur Dioxide Gas .July, 1952

FERTILIZERS and COMPOSTS

Rotation Fertilization .....Jan., 1952
Mineral Needs of Livestock ..Feb., 1952
Manure—Top Soil Builder ...Mar., 1952
New Soil Conditioner .....Mar., 1952

FORESTRY

Be Your Own Woods Boss ...Mar., 1952
Put the Dollar Sign on Decay.Feb.,1952

FRUIT

The Trailing Raspberry .....Oct., 1951
Controlling Mice in Orchards.Dec., 1951
Balanced Pruning of Grapes..Feb., 1952

HOGS

The Swine Show Judge .....Oct., 1951
New "Safe" Cholera Vaccine .Nov., 1951
Want More Pigs? .....Nov., 1951

A Breeding Plan .....Dec., 1951
Time Isn't Important to a Hog .....Jan., 1952
Feeding Your Swine .....Jan., 1952
The Sow is Half Outdated ...Feb., 1952
Monthly Hog Check .....Mar., 1952
Better Hog Production .....Apr., 1952
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Infectious Rhinitis .....May, 1952
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Self-Feed Nursing Sows .....May, 1952
Hogs Need Less Protein .....July, 1952
Raise Every Pig .....July, 1952

HORSES

Lipizzan Stallions of Austria. Je-Jy 1951
Profit in Ponies .....Dec., 1951

INSECTS and INSECTICIDES

Pest Control by Bacteria .....A-S, 1951
New Farm Chemicals .....Apr., 1952
Pest Control .....July, 1952

PASTURES

Kentucky-31 Fesque .....A-S, 1951
Trash Mulch Seeding .....A-S, 1951
Stretching the Grazing Season .....Nov., 1951
Reed Canary Grass .....Nov., 1951
Farm the Hills .....Nov., 1951
Mulches in Establishing Grasslands .....Dec., 1951
The Grass You've Wanted ...Jan., 1952
Soil Fertility and Pastures ..Mar., 1952
A New Pasture Every Morning .....Mar., 1952
Control of Broomsedge .....Apr., 1952
Improve Pastures—It Pays ..May, 1952
Grass Cuts Milk Costs .....July, 1952
Plan for Pasture .....July, 1952

POULTRY

Cholera in Turkeys .....Dec., 1951
Good Ventilation Pays .....Jan., 1952
Heat Lamps in Brooding Chicks .....Jan., 1952
Losses from Intestinal Parasites .....Jan., 1952
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Turkey Broilers .....Jan., 1952
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Using Solar Energy .....Feb., 1952
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Housewife's Choice .....Mar., 1952
Prevent Production Drops ..Mar., 1952
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Which Brooding System? ...Apr., 1952
Atomic Age Hits Poultry ....May, 1952
Good Feathering .....May, 1952
Hormonizing Chickens .....May, 1952
How Much From 500 Layers?.May, 1952
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Cut Broiler Costs .....July, 1952
Barnyard Goose .....July, 1952

SHEEP and GOATS

Profit from Well Fed Ewes...Oct., 1951
Two Lamb Crops a Year ....Nov., 1951
Death to Sheep Parasites ....Dec., 1951
Parasites Take Sheepman's Profit .....Mar., 1952
Sheep Industry in Ohio .....May, 1952
Increasing Returns from Wool .....Feb., 1952
Money in Sheep .....July, 1952

SOILS

Our Soil? .....Nov., 1951
Improving Tilth .....Nov., 1951
Soil Fertility and Human Nutrition .....Jan., 1952
Soil Fertility and Pastures ..Mar., 1952
Is My Soil Deficient? .....Mar., 1952
Manure—Top Soil Builder ...Mar., 1952
New Soil Conditioner .....Mar., 1952
Is Your Farm Hungry?.....Apr., 1952
Atoms Aid Plant Research ...Apr., 1952
Test Your Soil Vocabulary ...May, 1952
Soil Organic Matter .....July, 1952

VEGETABLES

Grow Better Sweetpotatoes ..Mar., 1951
If You Want Early Tomatoes.Apr.,1951
Backyard Hidden Treasure ...Oct., 1951

WEEDS

Healthy Ranges Resist Hologeton .....A-S, 1951
Check Your Weed Sprayer ...Oct., 1951
Grub Out Buckthorn .....Dec., 1951
TCA Controls Johnson Grass.Dec., 1951
Don't Put Up With Garlic ...Jan., 1952
Brome Will Strangle Quackgrass .....Jan., 1952
Killing Weeds With Chemicals .....Feb., 1952

MISCELLANEOUS

When Ideas Are Exchanged..Nov., 1951
Newest Aid in Rat Warfare ..Nov., 1951
Philippine Agriculture .....Nov., 1951
Social Security for Farm People .....Nov., 1951
U. S. Fact-Finders Abroad ...Dec., 1951
Indian John .....Dec., 1951
F.A.O.—Bulwark of Freedom .Jan., 1952
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Antibiotics and Plant Protection .....Jan., 1952
Fifty Years of Plant Science .Feb., 1952
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Farm Business Management — By Robertson and Woods. 1951. 546 pages, 248 illustrations. J. B. Lippincott. Prepared for use in all farm management and marketing courses. Combines the most up-to-date and authoritative content with the best farming practices available today in the field of farm management $3.80

The Hog Annual — Published by Farm Quarterly Magazine. March, 1952. Approximately 500 pages. First complete hog annual ever published. Contains names of all breed associations, secretaries, pig hatcheries, livestock yards, livestock commission salesmen, all of the hog farmers who sell over 400 hogs a year—fine articles on housing, sanitation, breeding and farrowing ...$5.00

Feeds and Feeding — New Edition (Abridged) — Published May, 1949. By Professor F. B. Morrison, Cornell University. 630 pages. Illustrated. $3.50

Cowphilosophy — By Mark Keeney. Second edition to which has been added the "Herdsman's Corner" and new material by the author. Fifty per cent larger. Holstein-Friesian World. A best seller since its first appearance in 1939. No agricultural book ever received a more enthusiastic reception from breeders and educators. Many college professors made Cowphilosophy required reading for their advanced classes in animal husbandry $3.00

Livestock Health Encyclopedia — By Seiden. Published November, 1951. Springer Publishing Company. Most recent veterinary book published, over 600 pages of helpful and useful information on how to diagnose and treat every ailment of livestock. Well illustrated $7.50

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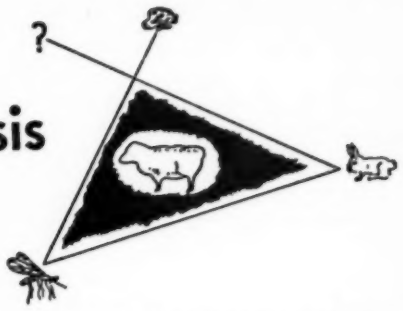
Myxomatosis



Wool men in Australia have set up a four-sided race between the rabbit, the sheep, the mosquito and a virus called myxomatosis. They may increase the wool crop if the last two win.

All four entrants are imported. Rabbits arrived in 1788, five strong, on a continent where few natural enemies disturbed them. By now Australia has a rabbit population that sheep men count at two billion.

Sheep came next, and entered into direct competition for grazing rights. Each sheep eats as much grass as seven rabbits. But reproduction rates ran against them. With a pair of rabbits producing 534 offspring a year, the sheep were destined to lose out.

The newest importations are the virus myxomatosis and a carrier mosquito to take it to the rabbit burrows. Hit by it, the rabbits obligingly succumb, leaving more grass for sheep.

This program sets reproduction rates working for them rather than against them. Mosquitoes and viruses produce at rates that make a rabbit's record look like an elephant's. But there is danger in productivity uncontrolled. What if the mosquito and the virus run out of rabbit food? Will they turn on the sheep or on the wool men? We itch to know. —*Business Week*